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# **CO-OPERATIVE PRODUCTION**





# CO-OPERATIVE PRODUCTION

THE PRIESTMAN-ATKINSON  
SYSTEM

*by*

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To  
WILLIAM DENT PRIESTMAN

## PREFACE

THE System of Co-operative Production described in these pages has given such great satisfaction where it has been adopted that the writer has considered it desirable to give wider publicity to the principles underlying it.

For several years the writer has carried on this work alone in the firm belief—and experience confirms the belief—that in its simplicity, its fairness, its satisfactory results and its profound effect on the relations between man and man and between men and management, this System has untold possibilities in helping to solve industrial difficulties, whether such difficulties are found in the individual factory or throughout the whole country.

The progress made justifies and urges a continuance of the work and the special knowledge and experience gained during these years in many industries is now placed at the disposal of those engaged in production.

1927.

H. A.



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***PART I***

**WAGES IN RELATION TO INCREASED  
PRODUCTION**





# I

## *Introduction*

WHEREVER production is carried on by two or more persons to their mutual benefit we get Co-operative Production.

But the circumstances in two different workshops, and the basis with regard to the share of each worker in production and in the benefits accruing from it may be vastly different.

Under the System of Co-operative Production about to be described certain principles are laid down, these principles forming the basis of the System. The actual details may be special to each industry, or even to each workshop—indeed, hardly any two applications of the System are alike and a System worked out for one factory cannot be applied to another even if the circumstances are apparently identical. This will be appreciated when the methods of application are described. But the principles are the same in every case.

The method was first applied in the workshops of Messrs. Priestman Bros., of Hull. During the war, production was urgently needed,

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and in order to secure the highest output a scheme of payment in relation to the total production of the factory was formulated.

First, it was ascertained how many tons of goods had been produced during the previous twelve months, and, second, how many hours had been spent on this production. With this as a basis it was decided to give the workers, as a whole, an interest in any increase above this amount of production, which was called the Standard Production. The tonnage produced and the hours worked were noted each month and compared with the Standard. If there was an excess, the percentage was calculated and the same percentage was paid on the wages of the workers for the period in which the excess was produced. This is the first of the principles of this System of Co-operative Production.

As the employees had never worked under such a method before, they were suspicious of it and did not view the proposal with favour, and it became necessary to give them a guarantee of an increase in wages in order to induce them to adopt the Scheme and to do their utmost to increase output. This inducement took the form of a definite increase in wages of 10 per cent., quite apart from anything they might earn under the System. Any percentage

increase in production was to be paid on the whole wages, including the 10 per cent. addition, this being quite justifiable as a war measure.

The System was introduced in April, 1917, and was an immediate and striking success—and a permanent one. For ten years—including the later part of the Great War, the great industrial boom and the greater industrial depression—it has been in operation, and the average increase in production during all this time has been about 40 per cent. It was suspended for a time during the worst of the depression, as it was thought the workers would be unable to earn a bonus owing to the uncertainty of business, but the men requested its continuance, and proved they could earn good bonuses under almost any conditions.

How the System meets all conditions of trade fluctuations is well exemplified by its progress at Messrs. Priestman's. The following occurrences have tended to hinder production :

- 1919. The Boilermakers' Strike.
- 1919. The Moulders' Strike.
- 1919. The 53-hour week replaced by the 47-hour week.
- 1920. The Railway Strike.
- 1920. The Colliery Strike.

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1920. Design of Specialities altered and Standard altered.

1920. Short time owing to slackness of trade.

1922. The Engineering Lock-out.

1926. The General Strike.

1926. The Coal Stoppage.

There have been other smaller troubles besides the above, and through them all the System ran smoothly. The 1922 Lock-out came during the depression and added greatly to the difficulties, but immediately it ended the System began to operate again, and the increase in production was 31 per cent. It is the opinion of the management that even when the System was suspended for a short time during 1921, many of the men were producing more than the Standard hourly output.

When the Moulders' Strike took place the men would have preferred not to go out, but they had to be loyal to their Unions. It was stated by one of the men when the strike was over that the System was in greater favour with the Union officials than even before the Strike.

Thus, in spite of these adverse conditions the feeling of confidence has remained unabated, and it seems that even through all these difficulties the sympathies of the workers are with

the management and those of the management with the workers. Had the men and the management had their way, strikes and lock-outs would not have occurred at all.

(Another case of success through many vicissitudes is that of a Steel Foundry, particulars of which are given on pages 142-8.)

The great success of the System at Messrs. Priestman's led to a wide demand for information, and in July, 1919, the Higher Production Council was formed through the generosity of Lord Waring, for the purpose of providing information concerning the Priestman and other methods of increasing production under satisfactory conditions. •

The Council consisted of Members from the ranks of Employers and Trade Unions, and after an active existence of three years it was amalgamated with the Industrial League in 1922.

The System was named "Co-operative Production"—somewhat unfortunately owing to the possibility of confusion with Co-operative Societies, Guilds and other organisations formed for collective purchase, sale and manufacture. With these it has nothing to do and has nothing in common with them, except that the basis is collective. But no more suitable name has been found which will exactly express the

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conditions of working, these conditions being in every way co-operative—between the workers themselves, between workers and management, in sharing results, in the endeavour to increase output.

In order to avoid confusion with any other system of collective payment of wages, the one herein described is known as the Priestman-Atkinson System, Messrs. Priestman having originated it, and the writer having developed it and made it capable of wider application. This is all the more necessary because it has been stated on more than one occasion that such a system has already been in operation, but on inquiry it has been found that the essential principles of Co-operative Production have not been applied or even understood, but only a crude form of tonnage or quantity basis has been tried—for instance, for every ton in excess of a given quantity a bonus of so much per ton is divided amongst the workers. This is not Co-operative Production in the sense of giving the men a bonus *pro rata* to their increased endeavour ; it is simply an *ex gratia* bonus given arbitrarily, the amount being the least that will urge the men to work harder, and could not possibly be applied to a workshop or factory where a variety of different articles are being produced.

Let us examine briefly the effects of introducing the System into a factory or workshop.

In the first place, it does not entail any reorganisation of the methods of working, nor does it interfere in any way with existing practice. Neither does it concern questions of works management, fatigue, monotony, welfare, etc., unless these arise naturally out of the operation of the System. These are all highly important matters, and it is most desirable to study them, but this System is independent of such matters, and they do not necessarily come within its scope.

The System may be introduced into a factory no matter what its organisation or state of efficiency. It takes into consideration only the existing state of affairs and provides a stimulus to greater production per man-hour whether the organisation be good or bad.

In an efficient factory it provides the men with an incentive to maintain that efficiency ; in an inefficient one, it is instrumental in bringing about a better state of affairs and in several cases it has discovered inaccuracies and inefficiencies which were totally unsuspected by the higher management.

However badly a factory may be organised it obviously fills a place and finds a sale for its products, otherwise it would cease to exist.



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If it does exist, it is equally obvious that if output is increased per man, or carried on more economically, the Employer can afford to pay something to the workers for this benefit.

But in putting in this System it is assumed that the Employer knows his own business best, and the System is a means of encouraging the workers to unite in making the best of either a good or a bad organisation. Increased output per man is always desirable whether a factory be efficient or not.

The financial effect of introducing the System will be one of the first matters to receive the attention of those who will be connected with it, and they may be assured at once that no one can possibly lose anything if the Standards be correct.

On the Employer's side, there will be no changes in the organisation unless they are made for the general benefit after the System has been in operation. There is practically no cost of running; there are no continuous expenses incurred in rate or time setting; there is no payment to the workers if there is no increase in output; there is no increase in wages or earnings unless a bonus has been earned or unless there is a general increase in wages to the whole trade. Even if there is no increase in production—that is, if the introduction of

the System produces no result whatever, which is practically an impossible event—the only loss is the small expense of introducing it, and even in this respect the System may be introduced in a manner that will entail no expense at all.

On the workers' side, it is impossible for them to lose anything under any circumstances. The day rate is guaranteed and, if the Standards be accurate, then if there is no bonus it is because the men are not making any extra effort. Even if the Standards are inaccurate they cannot lose anything, and therefore the only way in which wages are affected is to increase them.

The benefit to the Employer is in the saving of overhead expenses, the increased profit due to increased output, the production of more work from the same amount of machinery, less supervision, the avoidance of strikes or other stoppages unless of a national character, the quick and satisfactory settlement of disputes or difficulties in the works, the certainty of giving deliveries, industrial peace and confidence in the factory.

The results given herein should make every Employer, Director and Manager desirous of finding out whether the System will apply to the factory or works in which he is interested, and it may be asserted with confidence that

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no other System of any kind can be introduced with practically no cost, with no interference with existing organisation or works' methods, with no financial or other risk, with no expense in operation, and yet with such vast possibilities of economical production combined with the hearty co-operation and goodwill of all concerned. In connection with industrial prosperity the King's Message to the Annual Meeting of the Associated Chambers of Commerce in London, 1926, may be quoted : " The peace and prosperity of the community depend upon goodwill and co-operation in industry."

## II

### *Increased Production*

THE necessity for increased production has been a constant theme in the press and on the platform during the last few years. But neither press writer nor platform orator takes any particular interest in the practical methods of achieving the object they so strenuously advocate. They seem only to expect or demand some sort of miracle from some political party which will bring about some wonderful change that will result in a greater output of goods, and as a result make everyone happy. The reports of company meetings in the press give the opinions of a continuous stream of chairmen on this subject, and one can rarely read the report of a manufacturing company without discovering some comment on the disastrous effect of restriction of output (on the part of the worker) and the necessity of obtaining more output per man or of reducing wages in order to reduce costs, which will mean cheaper selling prices, wider markets and greater profits.

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There is a good deal of truth in this, but it is not all the truth of the matter. One thing is frequently overlooked, that the worker is the greatest consumer, and that if his effective wages are reduced he cannot buy the same quantity of goods he did before. A reduction of wages means, as a rule, less production and less consumption, that is, higher costs and restricted markets. But increased production per man is the essential factor in the endeavour to bring about industrial prosperity, and a sound, practical scheme of obtaining this is what is most needed.

Deputations have been sent abroad to discover the "Secret of High Wages," and books and pamphlets have been written about what is being done in other countries. But there is no necessity to study foreign methods; there is nothing new in them. It is no exaggeration to say that Co-operative Production, a System originated, developed and in active successful operation in this country, is not only especially applicable to British industry and British temperament, but in its comprehensive results is superior to any that can be found in any country in the world.

Apropos of this, the remark of Mr. Wilkinson, one of the Members of the *Daily Mail* Mission to the United States of America in the spring

of 1926, the object of which was to discover the secret of high wages in that country, may be quoted : " In regard to the spirit of co-operation in industry, of which so much has been heard since the deputation went to America, Mr. Wilkinson is a strong supporter of the system in vogue at the Holderness Foundry, which not only leads to material increase in wages, but also creates friendships between employer and employed which the deputation has seen nothing to surpass in America." This is from the *Eastern Morning News*, May 1st, 1926, the foundry referred to being the works of Messrs. Priestman Bros., Ltd., Hull, and the system being the one described herein.

What is needed in British industry is the common-sense application of methods already well known and practised in Great Britain, and one of the greatest hindrances to economical production and to a revival in trade is the reluctance to apply these methods, the fault being obviously with Management, not with Labour.

It is surely to the shame of British Management that a Labour publication, " The Waste of Capitalism," should have to urge the adoption of better methods of increasing output, and to point out how this can be done. In that book it is stated that " lack of organisation, lack of

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up-to-date equipment and lack of scientific design and lay-out are responsible for far more loss of production than the combined effect of strikes and all other forms of deliberate restriction on the part of labour." And, further, that "unrest is growing, not decreasing, and there is likely to be more and more friction and less and less production as time goes on if a remedy is not found."

Both Capital and Labour thus emphasise the need for increased production, and a sound, practical, successful scheme will therefore be welcomed by all parties connected with Industry.

The meaning of increased production is frequently misunderstood. It is often confused by both employers and workers with *excess* production. It is asserted that if goods which have been already produced and are standing in the warehouse cannot be sold, what is the object or sense in increasing production still more? But to increase production when the market is already glutted is absurd, and over-production in any industry indicates a lack of judgment, a mistaken estimate of the requirements of the market or an under-valuation of competition. So long as distribution and estimates of production are made in the present haphazard manner, any system of production is liable to break down.

The misunderstanding lies in the confusion between the production of a greater bulk of goods on an already overstocked market, and obtaining greater production per man from the workers. Greater production per man can only result beneficially to everyone, in a properly organised factory. It means less costs, greater sales and constantly increasing markets. It brings more and more commodities within reach of the poorer sections of the community. It increases the wealth of the whole country and wherever there is an increase in wealth there is also an increase in the material prosperity of the workers.

Increased output per worker is of greater benefit to the workers than to any other class because it is they who suffer soonest in trade depressions and, on the other hand, it is they who feel immediately the effect of higher wages and lower costs. Those who are better off need only discard luxuries in bad times ; the workers must needs discard necessities, thereby losing in craftsmanship, in health, in comfort and in heart.

It is even more important that there should be greater output per man in times of industrial depression than in times of prosperity, because then it is that staff expenses are proportionally higher, more persons are unemployed and wages



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tend to be reduced, yet it is at such times that men tend to restrict output and employers do not seem to expect as much work from their employees.

Of all industrial fallacies that of restriction of output is the most disastrous to the worker. There is a feeling amongst the workers that to restrict output is to help another man to a job, and when there is little employment to be had it seems a virtue to work as slowly as possible in order to keep in employment and to prevent other men from being discharged.

The contrary is the actual fact of the case. Restriction increases the cost of labour on the job and makes establishment expenses higher. In many factories the total cost of the work is a multiple of the labour cost and therefore every increase in the cost of labour means a still greater addition to the total cost. The selling price must be increased considerably if these two items of increased cost are to be met, and this limits the market and brings about unemployment as an economic necessity. It has already been stated that the worker is the greatest consumer, and therefore by restricting output he is putting up prices against himself and thus reducing the real purchasing value of his wages, besides imperilling his own employment.

It is difficult to get the worker to see this fallacy and it forms an excellent excuse for many of them to produce as little as possible. Carried to extremes, this means that if all the workers do no work the more there is for others!

From the employer's side, greater production per man results in a double advantage. First, he is free from losses due to restriction, because he pays only for actual work done; second, he has more production for the same or less overhead expense. This means that the goods may be priced much more accurately and he may reduce prices to a minimum without the fear of making losses due to restriction. The result is a lowering of prices to the consumer, that is, to the worker, besides which it widens the market, increases the sales and results in more workers being employed.

The worker has everything to gain and nothing to lose by increased production per man. It means greater wealth to the community and in the wealthiest communities real wages are always higher than in the poorer ones, so that high production always exists side by side with high real wages.

What is the opinion of the Workers' Representatives on this subject? It is quite evident that the Trade Union Organisations

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have no objection to increased output inasmuch as they criticise somewhat severely both the inefficiencies of management and the restriction of output by combines and rings for controlling prices. Better management means more output and this better management is demanded by the Trade Unions.

The remarks of many labour leaders indicate that the workers can produce more if they will, and these leaders appreciate the necessity of this if wages are to be increased.

The book issued in 1924 by the "National Joint Council" entitled "The Waste of Capitalism," which has just been referred to, emphasises the restriction of output on the part of management and endeavours to show that production may be increased more by better management than by the efforts of the workers. Even if this be so, it would not give the workers increased wages. They would eventually receive a benefit by the reduction of prices, but this would be more or less controlled by the employers, and such increased production would benefit the shareholder long before the worker received an increase in wages. Any increase in wages would have to pass through the usual routine of grievance, demand, threat, conference, compromise and settlement.

It is evident, therefore, that increased production is advocated by organisations of both Capital and Labour, and that, other things being equal, it is of general benefit to all classes of the community.

To the worker, however, discussions of this nature have little appeal. He is interested chiefly in three things—the amount of wages he receives, the amount of effort necessary to obtain those wages, and the conditions under which he earns them. He is frequently prepared to increase his effort if by doing so his wages are increased, but he sees no reason why he should make an extra effort to obtain greater output unless he receives a commensurate reward. Under day rates of wages payment, nothing is more natural than to work at an easy pace, doing just enough to satisfy the foreman or his own sense of duty. Every worker knows the feeling of having done a good day's work, but the feeling is tinged with dissatisfaction when he reflects that the material benefit goes into the pocket of the employer. And if by working slowly he thinks he is providing work for a fellow-worker an easy pace becomes all the more justifiable.

From the foregoing the following conclusions may be drawn :

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- (1) Increased production per man is essential for industrial prosperity.
- (2) The workers will not be inclined to increase production unless they receive a commensurate reward for their extra effort.
- (3) Increased wages are no guarantee of increased production.
- (4) Therefore some form of payment in relation to output becomes necessary if both employer and worker are to be satisfied.
- (5) To be permanent, such method of wages payment must be accompanied by goodwill and confidence between employer and worker.

There are several methods of "payment by results" and in order that their merits and demerits may be appreciated and compared with the method of Co-operative Production advocated herein, a brief description of each will be given.

### III

## *The Payment of Wages*

THE most usual method of payment of wages in the United Kingdom at the present time is day-work time-wages, commonly known as day-work.

Day-work is a contract to do work in return for wages. It is payment for attendance, but that attendance must be in order to perform work of a productive or other nature. For every hour worked the worker receives an agreed sum, and, wages being paid weekly, it is usual to calculate earnings at so many shillings per week. In other words, day-work time-wages means so many shillings per week on an hourly basis. Put in this way it seems a little contradictory but it is clearly understood. The hourly rate is the rule because a man may be discharged at one hour's notice.

When an employer pays wages on this basis he buys the man's time with the tacit understanding that he must work diligently and with that amount of skill customary to the trade and to the wages of that trade or that branch

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of the trade, whether he be skilled, semi-skilled or unskilled. Unskilled men in any trade are men without special training, but they have some special knowledge or untrained or uneducated skill which they learn by practice and which attaches them to the trade.

The payment of day wages, therefore, implies some return in the form of an expenditure of properly directed energy and that the worker has a certain definite duty towards his employer, that duty being to perform as much work as he can consistent with the conditions under which he is working, and without undue risk to life or health. H. Belloc says, in a book on Economics, "*There is no reason why a free man working for another's profit should do his best.* On the contrary, he has every reason to work as little as possible . . ." But, no doubt, this is only an instance of Belloc's delightfully fantastic humour.

A homely illustration may emphasise this point ; if you buy a pound of tea and ask the shopkeeper to give you a  $\frac{1}{4}$  lb. more for nothing he would think you were crazy. Yet that is what the employers are constantly asking the workers to do. On the other hand, if you pay for a pound of tea and you find you have received only  $\frac{3}{4}$  lb. you accuse the shopkeeper of fraud. Yet the workers frequently give

only three-quarters of the work they receive payment for.

It is desirable that there should be equity between buyers and sellers ; in other words, the equation between wages paid and energy expended (represented by the work done) should balance. Unfortunately, there is a variable factor in this equation inasmuch as no two workmen are possessed of similar degrees of skill and energy. If these could be measured or mutually agreed upon then wages should vary accordingly—from the point of view of economics. This variable output of different individuals, however, has led the Trade Unions to insist wherever possible on day-work time-wages being paid, and that all men in any particular trade must receive the same wages. This tends to reduce output to the average production of the least efficient worker.

Yet, if production can be measured and wages paid according to the amount produced it is more satisfactory to both employer and worker because each knows whether the bargain has been conscientiously carried out or not, and if the bargain be a fair one there cannot be any possible objection to it. But only under compulsion of one form or another will the Trade Unions agree to this method of



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payment, and a compulsory agreement is never very satisfactory as one party to it always feels aggrieved. The Piecework Agreement between the Engineering Employers' Federation and the Engineering Trade Unions, made in 1922, is an instance of this. There are a few exceptions to this determination on part of the Trade Unions, but in these cases it will be found as a rule that piecework has been the custom of the trade for many years.

There being no check on the amount of work done in relation to the hours worked under day-work, the worker has great opportunities of doing less than is expected of him, and only too frequently the duty of producing a fair day's work is removed from his conscience to his foreman. It is usually necessary for the foreman to be following up continuously each and every worker with the object of ensuring that each does his proper share, and immediately this supervision is relaxed, output is reduced.

Production during the war proved clearly that men and women can produce vastly more than is ever attempted when working under normal conditions. The following are some of the reasons for this :

The urge of war.

The enthusiasm of the women workers.

An atmosphere of great energy.

An unlimited market free from competition.

The study of all conditions making for high production.

The rapid training of unskilled workers which, combined with proper organisation and inspection of work, proved superior to the "skill" of skilled workers in the production of machine-made articles both in quality and quantity.

High wages.

High earnings meant that unskilled and semi-skilled men and women received more money than ever before and this induced them to keep up their production.

Piece rates could not be cut.

There were other factors but the above are the principal ones. Now, how in the long run did the workers suffer because of this extreme push in production? So far as can be ascertained, in no way whatever, physically or mentally, due to the work, though this high productive capacity was carried on for several years.

From this it is evident that some sort of direct incentive is necessary if men are to work to the best of their ability. Day-work does

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not provide this incentive and proves extremely unsatisfactory, though in a great many cases the nature of the work makes it unavoidable.

The situation is aggravated by the custom of all workers, good or bad, who are members of the same Trade Union receiving the same rate of pay. This rate tends to bring the production of all workers down to that of the least efficient worker, hence the necessity for close supervision. The foreman must all the time be urging the men, praising one for his speed in order to get him to work quickly all the time, but more frequently bullying the slower man to work a little faster. The criterion of the amount of work to be done is the estimate of the foreman, and this is subject to considerable variation. There is no inducement whatever for the men to assist each other.

There is, of course, a fundamental difference of opinion between the worker and the employer with regard to the amount of work which should be performed, and this leads to the employer endeavouring to get as much work as possible out of the worker. In many cases the worker is looked upon as a necessary evil and he is treated accordingly.

The worker retaliates by doing just as much work as will enable him to keep his job, and

the reasons given for low production are many and peculiar. If he is not satisfied with his wages, or if the conditions of his work do not please him, his output suffers. If he has a disagreement with his foreman, less work is done. If he is fined one shilling, he fines the employer ten shillings—through less output. If he has any sort of grievance, or if another worker has a grievance with which he is in sympathy, production is reduced. If overtime is worked, he goes easy *all* the time because of the strain. If the works are closed when he wants them open, or opened when he wants them closed, his subsequent output expresses his opinion. If the workers have a difference of opinion amongst themselves, they cannot produce to their full capacity. If it is "the morning after the night before," he gives the others "best."

Under the day-work system, eternal vigilance is the price of production.

It is this possibility of restriction of output that is largely responsible for the widespread desire to find a more satisfactory method of wages payment—one that will have some relation to the amount of work produced instead of a payment for attendance. This restriction is often denied by Trade Unionists, but the Report on "Hours of Work," issued

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by the Engineering and National Employers' Federation shows how much more work can be done under "payment by results" than under day-work. The investigations in preparing systems of Co-operative Production prove that men can produce more than they were doing before or after, and in some cases during, the War. The least productive time was in 1919 and 1920, and figures show that men can produce continuously fifty per cent. more than they were producing during that period. This refers to the whole output of the works, not only to individual workers.

## IV

### *Payment by Results*

PAYMENT by results is the alternative to day-work time-wages and a satisfactory method of such payment which is fair to all parties is the most desirable thing in industry to-day. If, in addition, the method brings industrial peace, confidence and goodwill, a long step has been made towards putting industry on a sound basis.

Opinions concerning wages payment in relation to output vary considerably. Employers, as may be expected, are almost universally in favour of it. For one thing, it enables the labour cost of a job to be known, and when a complicated article is to be manufactured, labour costs are very difficult to determine when day wages are paid. For another, many employers have no objection whatever to their workmen earning high wages so long as they give an equivalent for it in work accomplished, and the higher the wages the greater harmony in the factory, as a rule. The Ford Motor Company pays very high wages and the

consequence is high production, low costs, and a thoroughly sound business. Sir Alfred Yarrow says, "The man who does twice as much work ought to get at least double the pay. . . . The first great step in obtaining greater production is to pay a man according to what he does. Every man ought to be free to do what work he likes."

But many Trade Union Executives are against payment by results because their members earn different amounts of wages and this, they contend, leads to "inequalities." The arrangement to guarantee day wages removes the older complaint that under piecework the men did not earn enough to keep them in decency. There is another argument, namely, that if a shop goes back to day-work after working on piecework the amount of work expected under day-work is determined by the previous piecework production. In other words, it is contended that output should be reduced when on day-work, and this, surely, is an argument in favour of payment for output instead of for time worked.

Other Trade Union executives, however, accept the principle, while some have "no objection to it so long as there are safeguards." It is curious to find that in some cases where the executives are against the principle, some of

the leading officials of the same Trade Union are in favour of it.

The general opinion of the Trade Unions may be summed up in the following report in connection with the Conference held at York in 1920 : " The General Workers' Union, representing the unskilled workers, accepted the terms of adjustment practically *en bloc*, but the skilled unions took grave exception to proposals regarding payment by results which the employers sought to make an essential part of their general offer. The objection of the Unions was not to payment by results as a principle. They made it clear that they would accept it accompanied by adequate guarantees. One of these was a safeguard against any attempt by certain firms to set up piece-price output as a standard for day-wage production."

Since then the Agreement on Payment by Results made in 1922 has been in operation, which enables the employer to adopt any system of payment by results he may prefer so long as certain conditions are observed.

The workers themselves are in favour of the principle, as a general rule, where they believe the basis is fair and unless they are influenced by adverse Trade Union opinion. They are always ready to exert themselves a little more if they reap a direct benefit by doing so ; and



if the circumstances are such that they keep on friendly terms with their fellow-workers and with the management they welcome it. Where they are influenced by Trade Union opinion or where they have had unfair treatment when working under this method, they are violently against it.

Mr. F. S. Button states definitely that "There could not be any doubt at all that the average working man preferred to be paid on a system of payment by results." Mr. G. D. H. Cole says, "The workers are not opposed to payment by results in all cases, but only in those in which it lends itself readily to fraud by employers, and to quarrels among the men in the workshops. If their objections on these heads can be met, they should be quite prepared to consider on its merits any proposal for extending the system. . . . I should insist, as far as possible, in making piece-work a 'collective' or 'fellowship' system, and, in any case, on full trade union participation in the making of the piece-work bargain."

The following comment on the Clyde shipyard dispute in 1921 is extracted from the *Journal of Commerce*: "There are an increasing number of men who have agreed to the policy of payment by results. This is in face of strong opposition on part of their union, which,

for some reason or other, objects to the principle."

Mr. Alexander M. Thompson says, "With such effective safeguards . . . as Mr. Clynes and Mr. O'Grady have secured, the adoption of payment by results should prove a tremendous benefit to industry and a boon to willing and efficient workers."

Speaking generally, it appears that some form of payment for output which is approved of by both employer and worker will be welcomed by everyone, with the exception of a few Trade Unions.

Quite frequently "payment by results" is considered to be the same thing as piece-work; this is especially so in the minds of the workers. Piece-work, however, is only one of several methods of such payment.

Again, "payment by results" almost always refers to payment for work done on an individual job or for a definite number or group of jobs on which a definite price has been agreed to, and it is well to confine it to this form of payment.

## *Piece-work*

THE Straight Piece Rate is one of the best and simplest methods of payment by results where the conditions are fair and just, where all men are treated alike, and where there is no cutting of rates. It has been practised very widely, and its one great advantage is that the labour cost of the job is known, the worker being paid in exact proportion to his production.

In practice, however, this method has created incalculable trouble and dissatisfaction, owing partly to the conditions mentioned in the last paragraph not being observed, and partly to inherent faults of the method.

Each job has a cash value placed on it and the individual worker on that particular job is independent of all other workers engaged on similar work. Each man is not concerned with his fellow-workers, and it is to his interest to concentrate on his own job and to obtain the best jobs in the factory. He may earn much or little, according to his diligence and skill and the price of the job.

*It is essential, of course, to have a rate-fixing department of some kind. In small shops the foreman fixes the rate, but in factories with a great variety of products a special staff is engaged in fixing prices. In one factory employing about 200 girls, over 30,000 piece rates were recorded.*

The fixing of a satisfactory piece rate is one of the principal difficulties of piece-work. Where it has been in operation for many years and the prices have been modified from time to time no doubt a more or less permanent basis has been reached and, as new work will bear a great similarity to existing products, new piece rates will be reasonably proportionate to existing ones. But where rates are not so highly standardised and there is a good deal of variety in the nature of the individual jobs, prices may be too high or too low compared with others.

If the rate be fixed too low, the worker immediately brings this to the notice of the rate fixer or the foreman and the price is reconsidered and frequently increased. If the rate be too high, the worker makes no comment, but the job is looked on as a soft one. From this it is evident that there is a tendency for all rates to be too high. In some factories low rates are not altered for two reasons, one

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being to prove the infallibility of the rate-fixing department and the other being the opinion that high and low rates average out. The latter statement is often made and is a clear admission of the faultiness of the method. In some factories the real productive capacity of the workers bears little relation to the piece prices. The following is an instance of this : " A certain piece of work was estimated to be a four hours' job and a job rate based on this amount offered accordingly. The workman ridiculed the rate, stating that the job could not be done in less than eight hours ; but he said further that in another works a few miles off a piece-work rate of 20/- was being paid for the same operation done under similar conditions, or five times the amount offered. The statement was verified, but the job was done eventually in four hours. It is suggested that if the rate of output achieved in the first works had been reached in the second, this would have been regarded by them, probably, as a wonderful increase in output which could not have been foreseen."

It has become the general practice to assume that the earnings of a worker on piece-work should exceed his day-time rate by  $33\frac{1}{3}$  per cent. Experience in the past has proved that if the work produced under day rates be measured

and the day rate be given to the job, then the incentive of being paid for the amount of work produced resulted in an increase in production of from 20 to  $33\frac{1}{3}$  per cent. If earnings were higher than this, it was considered that the price was too high, and that a mistake had been made. Adjustments were therefore made and earnings about 25 per cent. above the day rates were considered to be fair, while good men could earn much more than this. In recent years a figure of  $33\frac{1}{3}$  per cent. has been considered more satisfactory, and this has become the measure of the earnings of a piece-worker under normal conditions, piece prices being fixed on this basis. But this does not make the fixing of the price any easier.

One of the clauses in the Agreement on Systems of Payment by Results made between certain Trade Unions and the Engineering and General Employers' Federation in 1922 is as follows: "Piece-work prices and bonus or basis times shall be such as will enable a workman of average ability to earn at least  $33\frac{1}{3}$  per cent. over time rates (excluding war bonuses)."

To those who are not affected by this Agreement, such a clause seems incomprehensible. If the piece price is the day-work labour cost, the assumption must be that the worker of average ability is capable of producing  $33\frac{1}{3}$  per

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cent. more than he was doing before the piece rates were adopted and that the piece price will induce him to achieve this extra output. But this does not seem to be the meaning of the clause. If the intention is to fix a piece price  $33\frac{1}{3}$  per cent. in excess of the day-work labour cost, this is increasing the worker's earnings by  $33\frac{1}{3}$  per cent. without any extra production. This, too, does not seem to be the meaning of the clause, unless this extra payment is made to ensure diligence and steadiness of working; this seems rather a high price to pay for it, though the inefficiencies of the day-work method may justify it.

There is one more alternative to the above, namely, to fix a piece price somewhere between the day-work labour cost and  $33\frac{1}{3}$  per cent. above that cost, but what is to determine such a price is not mentioned nor is any possible method suggested. If this is the intention, then the clause shifts the responsibility of determining piece prices on to the shoulders of the individual rate setter or rate-fixing department and matters are exactly as they were before.

Again, the term "average ability" opens up infinite possibilities of discussion and disagreement, as it is not stated what basis or standard of output is to be taken in order to determine

average ability, nor who is to decide whether any individual worker is of average ability or not. Anyone who has worked in an engineering shop can imagine what takes place between the workman and the rate setter or foreman when piece rates are being or have been fixed and this clause is brought into the argument !

This instance is given to show that even the officials of the Employers' Association and the Trade Unions—who possess all the available statistics on the subject, who are highly skilled in negotiations of this kind, who are thoroughly practical men whose ability and experience in settling matters of this kind are so great that the whole of the Employers and the whole of the Trade Union members give them plenary powers to deal with the subject as they think fit—are quite unable to find a rational basis for determining what a piece rate should be or what it should be based on.

Little wonder, then, that individual factories should find the matter difficult and that the " trial and error " method should be so common.

Under the same agreement the day-work time-rate of wages is guaranteed irrespective of piece-work earnings and any debit balance against the worker is to be cancelled, so that the worker cannot lose by working on the piece-rate system.



The great objection to piece-work is the cutting of rates. In the past, under the rule-of-thumb methods then in vogue, this was quite a frequent occurrence which created a permanent distrust in the minds of the workers, and the tradition still remains though the practice is not nearly so common at the present time. That it still exists is evident from the Report made to the Industrial Fatigue Research Board by Dr. Myers and Miss Wilson where they say :

“ We were painfully impressed by the pre-occupation of Trade Union officials with the struggle for the establishment and maintenance of fair rates, inevitable in the present atmosphere of hostility and suspicion. . . .”

The tendency to cut rates is fostered by the different productive capacities of the workers. It is well known that certain workers can produce two or three times as much as an average worker without deterioration of quality. This means that under piece rates such a man working at his natural speed earns two or three times as much as an average worker. It is easy to understand that the foreman or manager arrives at the conclusion that the other workers are deliberately refraining from producing as much as they reasonably can and that the piece rate is too high. The excessive earnings on

the part of one or two highly productive workers is thus made the excuse for a reduction in the earnings of all average workers. Concerning this aspect of the method, G. D. H. Cole remarks, "Always there are 'fat' jobs and 'lean' jobs, and a job which is fat to one man is lean to another, or is fat to the same man if one machine is available and lean if it has to be done on another."

The following comment by one who has worked under piece rates is interesting, "In nine cases out of ten the workman has no voice in price-fixing. The price is stated to him, and he is told that the job has been done for the figure, and if the worker cannot do it he is no use there, and is told to clear out. He has no other remedy: either do the job at the price offered or leave. If, rather than leave, he does the job, or tries to do it, he gets into debt. Then he is discharged as being too slow. . . ."

Thus there creeps in a new factor—the worker must produce so much more or be discharged. He has no choice—he cannot limit himself to earning day-rate wages, and Sir Alfred Yarrow's remark, quoted on page 40, that "Every man ought to be free to do what work he likes," will not receive the approval of the management in all cases. If rates are unjust, it is evident that piece-work leads to dissatisfaction

on the part of the worker and greater profits to the employer. There is an unpleasant corollary to the piece-work method which the Trade Union Agreements have endeavoured to guard against and which is expressed by the worker as follows: "I know of firms that have insisted on men working piece-work, and they have accepted it, thinking they could get a few shillings extra, not considering the extra wear and tear of their bodies, for that's what it means; and after a short time of that system they have been put off and fresh men taken on to work day work and had to do the same amount of work as was done by the piece-worker."

When rates have been cut on a few occasions the workers determine not to work to the best of their ability on any job in order that the general run of piece prices may be so high that they may earn their piece wages (day wages plus  $33\frac{1}{3}$  per cent.) comfortably. From the workers' point of view a highly productive man spoils the job for all others and hints are given to him to go slow in order to give the others a chance. This means that the man must cut down his speed, which is more or less unsatisfactory to himself and restricts his earnings.

It is asserted frequently that in many factories piece rates are never cut. This statement may always be received with a certain

amount of caution because there are more ways than one of cutting rates, though it is no doubt true in many cases, especially those mentioned above where work is similar and there is an experience of many years of satisfactory piece-rate working. But let us again refer to the opinion of the worker: "I know several shops that I have worked in where jobs I have done have been cut down, varying from 20 to 30 per cent., 40 to 50 per cent., and even 200 per cent. in price. . . . I have worked in many shops in various parts of the country, and in every shop the same thing prevails."

Some years ago the writer invented a saw-bench for producing a much greater quantity of boards than existing machines were capable of. It was introduced into a box factory, and after several weeks' trial the firm reported that it did neither more nor less work than their existing machines. An investigation was made and it was discovered that the men were all on piece work and the operator on the new machine who had to work hard all day on the previous machine to earn his full wages now worked hard only during the morning and had a very easy time for the rest of the day. He was asked why he did not work steadily right through the day and earn far more wages than he had ever earned before. After a few

moments' hesitation he remarked, "Do you think I want the prices to drop for the whole of the men in the works?" An excellent testimonial for the machine but a sorry one for the firm.

With regard to high earnings, a leading article in *Engineering* states that "The employers' difficulty with regard to very high piece-work earnings on particular jobs is of another kind altogether. Such earnings cause so much discontent among those who have less lucrative occupations, or who are not doing piece-work at all, that some adjustment becomes necessary in the interests of peace and harmony in the works. This, in its turn, is liable to have effects as harmful, even if not so obviously so, as the inequalities it is intended to prevent. The workers lose confidence in the integrity of the management, they look upon piece-work as a means of securing enormous outputs from them at little more than day-work earnings, and from motives of self-protection they may deliberately refrain from doing their best in order not to 'spoil the job,' by bringing about a reduction in their piece rates."

A case of the above kind came to the writer's notice recently, a worker on a machine earning, in one week, a little over £20. This became known to other workers, and in order to avoid

trouble the worker agreed to a cut in the price. The new price enabled him to earn on the average about £12 a week. The employer was quite satisfied to give him the £20—on a piece-work basis—because it was an expensive machine and no other worker could produce even half the output of this particular worker. But the cut was made to the mutual satisfaction of employer and worker.

In the article above quoted it is stated that “The possibility of errors in judgment in rate-fixing are so great that an absolute guarantee that rates once fixed shall never be lowered can hardly be given, and, needless to say, it is the cutting of rates which has been the curse of the piece-work system.”

An objectional feature of piece-work is that it fosters jealousies between the average workers and those who earn high wages, and it is well known that foremen select soft jobs for their friends. Cole remarks, “I have heard scores of workers say of payment by results—their keenest criticism—that it sets men against men.” And our worker states that “Enmity and ill-feeling among the men is also caused by the partiality shown. A few men get the pick of the jobs that are fairly well paid for, and the remainder are working like Trojans all the time, and year in, year out, scarcely ever get a shilling

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over their day wages, and are very often in debt—not because they are not as competent as the others, but because of the low price of the job they are on.”

During his apprenticeship the writer had a piece-work job given to him at a price  $33\frac{1}{3}$  per cent. less than the price allowed only a few days before. The person who did the job at the higher price was in the foreman’s Sunday school class !

There are other peculiarities in connection with the system. The worker just cited says, “ It encourages one man to hide his tools, or steal tools from his fellow-workman, which is done very frequently, and some indiscreet men are apt to boast of what a good price they get for the work and pride themselves on how they bluffed the foreman, or whoever put the price on, and when a foreman has such men as that to deal with, one cannot blame him for cutting the work as fine as possible.”

In the more modern workshops some of the objections mentioned by this worker cannot apply—but how many *modern* shops are there ?

To get even an approximately accurate price, it is necessary to study every job and this means a rate-fixing department, which is an overhead charge due to the system and should be debited against it. Even then one cannot be sure that

the rate-fixing is correct. In a large works in the neighbourhood of Woolwich a number of articles had to be made to a certain drawing. Some of the articles were in steel and some in brass, and the price of the job was the same both for steel and brass !

In some factories the employer refuses to pay more than time-and-a-half no matter how much is earned, and nothing is carried forward to the worker's credit. In a factory known to the writer when the worker goes on piece-work he receives time-and-a-third (day wages plus  $33\frac{1}{3}$  per cent.), no more and no less, no matter how much work he does. In still another factory a standard daily rate is paid and a small piece rate in addition, the wages being combined of the day-work standard wage plus the amount earned under the piece rate ; it is stated that the workers are always in debt to the firm.

In many cases the workers will not earn more than  $33\frac{1}{3}$  per. cent. above day wages, and if they find towards the end of the week that their earnings may exceed this amount they slacken their efforts or lose time. This is quite common, the reason being that prices may be cut or other workers may suffer. It is said that the Trade Unions encourage this, and it cannot be wondered at.

Where there are standard piece rates for the



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whole industry, as in the Light Casting, the Bedstead, the Bootmaking and the Saddle-making industries, the question of cutting rates does not arise to the same extent as where rates are confined to one works. Again, where work is of a similar nature, such as the Tin Box or Cardboard Box trades, and where from long experience it is known just what the machines and the workers are capable of, piece prices are much more stable. But Trade Boards have proved to be necessary in some trades in order to enable the workers to earn wages which will keep them in decency, and piece prices have been revised for this purpose by the Boards.

Where most of the job is done by machinery which is more or less beyond the control of the worker, also in spinning, weaving, and automatic machinery for engineering details, piece prices tend to be more accurate as output is largely controlled by the machine.

In one factory the piece price was determined by the selling price of the article. The selling price was arranged by a group of manufacturers so that piece prices followed adjustments of selling prices. This proved satisfactory, but the value of the jobs to the worker varied considerably. There could have been great opportunities for favouritism, but the work was done by gangs of men instead of by individual

workers and this ruled out favouritism, though the men in the gang always tried to get good workers to replace those who dropped out.

The gang or group method—sometimes called collective—tends to minimise some of the inequalities mentioned. A price may be arranged for one large job on which a group of men is engaged, or a group of men may share a number of jobs. In the former case group payment is necessary, but in the latter it is an expedient in order to get rid of friction and to equalise earnings. It has the advantage of unifying the men's interests, but the question of determining a fair price for the job or jobs still remains.

Another method of fixing a piece rate is to call into consultation the worker who is to do the job and discuss the price with him. This can only be done where the job takes a considerable amount of time in its execution ; on small work too much time would be wasted in discussing prices. Where this method can be adopted it proves much more satisfactory than the arbitrary setting of rates by a rate-fixer. But sometimes when a worker finds he has agreed on a price which will result in wages only a trifle over his day wages he will slacken his effort so as to show a loss and then try to negotiate for an allowance.

Where piece-work is in operation there is

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always a large residuum of day-work men. For these there is no incentive whatever to increase their efforts, though such men—engineers, tool makers, works clerks, unskilled labourers and others—can be of great assistance in increasing total output by keeping machines in order, by controlling the flow of work, by keeping the skilled men well supplied with materials, by intelligent help and anticipation of what is required, by the quick transport of work.

If the piece-workers earn  $33\frac{1}{3}$  per. cent. above their day rates, obviously they are increasing effort to some extent, this extent depending on the price of the job in relation to the day-work labour cost. The labourers must, of course, keep pace with the other workers, but they get nothing for their effort and the employer gets the benefit. Sometimes the labourer shares in the bonus of the group with which he is connected, but this is not a very common practice, and, even so, very few men can be included, so that the greater number must remain on day rates.

## VI

### *Premium Bonus Systems*

PREMIUM Bonus is the name given to a method of payment by results where time is the basis instead of price. In effect, it is the same thing, but a time is given for the job and if it be done in less than the time allowed the worker is paid an increase in wages for the time actually spent on the job.

All the objections mentioned in connection with piece rates, with one possible exception, apply to this and we must therefore look for any compensating advantages. The principal advantage is the belief that it does away with the desire on part of the employer to cut down the time, and therefore the wages earned, on the job ; this is the exception referred to in the last sentence. Curiously enough, this advantage is not inherent in the method but only in a phase of its application. Exactly the same could be done when giving a piece-work price but it isn't, because, though a worker may be agreeable to share with his employer the *time saved* on a job, he would not be quite so agreeable to share the

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*extra money earned* on that job ; yet it is exactly the same thing.

If (1) the time set on the job is the actual time in which the worker is expected to do the job, and (2) he is paid for all the time he saves, it is the same as piece-work, therefore these two conditions do not operate at the same time. Usually, the time given is not the time the job is expected to take, neither does the worker receive payment for all the time saved.

The two best known methods of Premium Bonus payment are the Halsey and the Rowan, the former having originated in America and the latter in Scotland.

In the Halsey system the time set is the time, or is supposed to be the time, in which the worker is expected to do the job, but he does not receive payment for all the time he saves, if any. He may receive one-third, or one-half, or two-thirds, or other proportion of the time saved, but not all. Frequently, it is one-half.

In the Rowan system he receives as much percentage increase on his wages for the time *spent on* the job, as the percentage he saves on the time *allowed for* the job. Therefore, if he does the job in no time at all he receives double wages, and no more, for that time ! If he does the job in 50 per cent. of the time

allowed, he receives 50 per cent. addition to his time wages for the time he takes.

As an example, suppose the time allowed on a job be 4 hours. If the worker takes 20 minutes he receives  $38\frac{1}{2}$  minutes' wages ; if he takes 1 hour he receives  $1\frac{3}{4}$  hours' wages ; if he takes 2 hours he receives 3 hours' wages ; if he takes 3 hours he receives  $3\frac{3}{4}$  hours' wages ; if he takes  $3\frac{1}{2}$  hours he receives  $3\frac{5}{6}$  hours' wages ; and if he takes 4 hours he receives 4 hours' wages. This obviously means that the less time he takes the less wages he receives for the job, but the more wages he receives for the *time spent* on the job. Under ordinary piece-work he would receive the full 4 hours' wages no matter how long or short the time spent on the job.

In these two systems, if the times set are the actual times in which the job is supposed to be done, then if this time be reduced some portion of the saving goes to the employer. If the time is not the actual time but some fictitious figure, there is a fundamental error in the system. In a large firm of motor engineers where the Halsey system is in operation, the times allowed are 50 per cent. in excess of the times in which the work can be done under day rates. If the worker saves any time on the job, he receives half the time saved and the Company receives the other half, so that if he takes the same time over the

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job as he would have done under a day rate system, he receives 25 per cent. addition to his wages, and the Company receives—well, it depends on the system of costing how much the Company can credit themselves with.

The great claim made for the Rowan system is that no matter how careless the time-setting may be, the Company cannot lose more than a certain limited amount. Suppose 100 hours be given for a job and the worker takes 1 hour in which to do it, he would receive 1.99 hours wages. Such a method seems to put a premium on loose time-setting as well as on the work.

Under the Rowan system it has been stated above that the less the time taken the less the worker receives for the job. It is claimed that the proportion he loses is not excessive until he has reduced the time to half the time allowed, and this is true. Also, the times set can rarely be so bad that a man of average ability can do it in half that time. But the most valuable man in any factory is the highly productive worker, no matter what system be adopted, and the Rowan system penalises such workers more than any others. It must be borne in mind, however, that though the worker receives only a portion of the time he saves, the times are often generous and the real test is the worker's excess earnings over his day wages.

It should be mentioned that the Halsey system was introduced in connection with Scientific Management and that before a time was set the best way of doing the job was ascertained. When this way was discovered and the time for performing the work was taken, certain allowances on the base time were given by means of which a worker of average ability was able to earn a certain definite bonus if he observed the conditions laid down in the Instruction Sheet. It was the amount earned in excess of this that was to be shared and there can be no great objection to such a basis.

Where the job is not studied scientifically but the time is set by opinion or estimate, considerable increases are given on what is thought to be the actual time which ought to be spent on the job and this opens the door to great variations and inaccuracies in time-setting, because the time must be some arbitrary figure in excess of the actual time. In one instance the time given was 77 hours and afterwards it proved that the time taken was 230 hours. In another case, "the time allowed for a certain job was 110 hours ; the time booked was always 60 hours, this being the trade union minimum. Some time after the outbreak of war the embargo was raised. The time taken to do the



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job fell to 30 hours—110 hours to do a 30-hour job needs no comment."

The complicated calculations necessary before a man can discover how much he has earned, or the time he must do the job in so as to earn a figure which the worker has in mind, is a great objection to these systems, especially the Rowan. There is much time spent on such calculations that might be usefully employed in doing the work, and lathe-beds are found covered with chalk-figures—and even then there seems to be a doubt.

It is this difficulty of calculation together with some part of the saving being credited to the employer that makes these systems unacceptable to the worker, besides which, there is no guarantee that most if not all the objections to piece-work will not obtain in these systems also. *Engineering* says, "It might be thought that such a system as the Rowan, which appears to avoid the outstanding difficulties of straight piece-work, would meet with general approval both by workmen and employers. This, however, is not the case by any means. In the first place, the workmen find it very difficult to understand and are, therefore, suspicious of it. . . . Even when understood, however, the system is viewed with disfavour because the greater the output in a given time

the less the earnings per piece made. . . . He feels that he is labouring under an injustice, and he regards the system as an arithmetical trick devised to reduce his piece-rates in proportion to his output."

## VII

### *Profit-sharing*

PROFIT-SHARING is not payment of wages but it is frequently adopted with the object of obtaining greater production and also of sharing with the workers the prosperity of the business.

It has been very largely advocated for many years and Parliamentary Reports have been issued giving particulars of various schemes ; it has also been the subject of many other books and reports. The method has been introduced into many industries, being successful in some and a failure in others.

The success or failure of Profit-sharing in general is a matter of opinion because the statistics prove it to have been both. That is to say, while it has been a striking success in some instances it has been a great failure in others, therefore one can only judge the results by a comparison of successes and failures, or, what is more important, by the average benefits to the worker in those cases which are considered to be successful.

According to the " Report on Profit-sharing

and Labour Co-partnership" issued by the Ministry of Labour in 1920, there were then 146 schemes in existence, exclusive of Gas Companies, out of 344 which had been in operation. Thus, considerably more than half had been abandoned. Many of them were discarded for reasons not concerned with the principle, such, for instance, as Companies going out of business. Many of those remaining are of doubtful success.

The profits paid to the workers amounted on the average to a little over 5 per cent. of the wages paid, and from our experience this offers no inducement whatever to the worker to make any effort to increase production. Cole remarks, "What self-respecting workman would work piece-work for earnings of 6 per cent. over his time-rate?"

An unfavourable feature of most of these schemes is that they are hedged about with such conditions as to prevent the worker from taking any real whole-hearted interest in them. There is usually a sort of good-humoured, half-contemptible acquiescence in the scheme—"it doesn't do me any harm and it pleases the guv'nor" attitude—on the part of the worker; especially when he is informed that by receiving shares instead of cash he becomes a partner in the Company.

For what does this amount to? In a well-known case, the profit is given in the form of shares at the end of each year. The worker receives the interest on these shares at the end of the following year, or thereabouts. If he receives the average profits, namely 5 per cent. as mentioned above, he is allotted shares to the value of £7 10s. on a year's wages of £150. If the dividend is 5 per cent. he receives in cash 7s. 6d. at the end of the second year.

Of course, if the profits and dividends are greater, he receives more, but the above are averages. Suppose he receives a profit of £20 *in cash* at the end of the year—quite an exceptional figure and condition—then this is certainly some inducement for him to take an interest in his work and in the progress of the Company. But if this £20 is allotted in shares, and even if the dividend be 10 per cent., he receives £2 in cash at the end of the second year. In some cases he cannot part with the shares, but they must be returned to the Company at his death or if he leaves the service of the Company.

Length of service, good conduct, and other conditions are also factors determining the sharing of profits in some cases.

If the workers earn enough to pay 10 per cent. on their shares (assuming that these are ordinary shares, fully participating, and not

bonus shares partially participating) then they are also earning 10 per cent. for the rest of the shareholders. If they own 10 per cent. of all the ordinary shares, then of the gross profit available for dividend they receive 10 per cent. and the shareholders receive 90 per cent.

The extra profit which is divided is not all due to the energy of the worker, but much of it is, and certainly the object of the scheme is to stimulate him by offering to share with him the result of his increased effort.

The deduction to be drawn from the foregoing is that profit-sharing does not appeal to the workers because in the first place the benefit is too small, in the second it is too remote, in the third the conditions are too stringent, in the fourth they have no control over the amount to be divided, in the fifth it is an *ex gratia* payment which may be withdrawn at any time.

Moreover, any extra effort on the part of the workers may be completely nullified by bad conditions of trade, by bad organisation, bad salesmanship, bad buying, while on the other hand the worker may make no extra effort at all, and if the general conditions are good instead of bad he may receive good profits. From this it is evident that the personal effort of the worker has little or nothing to do with the profits he receives.

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The manipulation of Capital may also affect profits. Watered stock, or the gift of "bonus shares" to the shareholders, means a reduction in the percentage of dividend though the amount in cash is the same to the shareholder. When there is a minimum dividend to be paid before profits are shared, it will be seen how the workers' chance of profits is reduced by such a transaction.

When profits are high, larger amounts may be put to reserve, and salaries of Managers and Directors may be increased and these again tend to reduce the profits to be shared.

Profits are, necessarily, obtained through the prices charged for the commodity. The higher the price to the consumer, other things being equal, the more the profits. Profit-sharing is, therefore, in the nature of dividing the spoil, and as the workers are the greatest consumers, they are *all* exploited in order that a *few* of them may share the results of such exploitation. It would be much better to arrange for good conditions in the factory, give good wages to the employees, and then lower prices as much as possible to the consumer in order to create a wider market, which would mean more employment instead of sharing profits.

There is a tendency on the part of some employers to look on profit-sharing as increased

wages, and low wages are sometimes excused because the workers can bring them up to or above the average by increased effort.

It was found in some cases that the workers, when requested to invest their profits in the business, preferred to spend the profits in their own way rather than devote them to expanding the business.

The principle of profit-sharing is in itself good, but its value has been frequently destroyed by the conditions which are attached to it. The great point in its favour is that the worker knows he will share in any profit above a certain amount and that the Company cannot make great profits out of his efforts unless he, too, gets some benefit. The conditions also tend to make the worker stick to his job, as in most cases he receives no benefit until he has been working for at least a year and if he leaves and is afterwards re-engaged he has to begin at the beginning. Again, in some cases the longer the service, up to a stated number of years, the greater the share of profits.

The scheme appeals most strongly to men of a steady and thrifty disposition, and the accumulation of shares will undoubtedly create in the workers a keen interest in the prosperity of the Company.



## VIII

### *Co-partnership*

CO-PARTNERSHIP is frequently associated with profit-sharing, though the two things are quite distinct. But in many cases the profits in profit-sharing schemes are not distributed in cash but in shares of the Company, hence the tendency to confuse the two.

It is obvious that any worker can buy shares in the Company in the open market at the market price, and therefore Co-partnership in reference to the worker has a special meaning. It means that either profits are distributed in the form of shares, as just mentioned, or that a certain class of shares in the Company is set aside, usually at certain definite prices, which the workers may purchase by contributions of one sort or another. The Company usually encourages the purchase of such shares by arranging the payments to be spread over a period. The shares may have a variable or a fixed rate of dividend.

The question of inducing the worker to increase his output does not enter into this Co-partnership transaction. The main object

is to give the worker an opportunity of having a personal interest in the prosperity of the Company quite apart from his wages. But if a worker has a share in the Company by whom he is employed he must feel that it is to his interest to keep steadily at his work and to see that others do the same. .

That Co-partnership makes the worker a capitalist on a small scale is nothing against the principle in the present capitalist condition of Society. There are, indeed, advantages in this because it makes the worker take an interest in the conditions of industry and induces him to study a little of finance and the broader issues of trade. Every person who puts a pound in the savings bank and receives interest on it is a capitalist in the broad sense and, therefore, almost all the steadier and thriftier class of workers are capitalists. It has been shown that the workers at the present time own capital to the extent of about £1,000,000,000 (one thousand million pounds) in one form or another, so that shares in a Co-partnership scheme will not undermine the *moral* of the worker. This is only mentioned here because it has been said by some people that Co-partnership is an endeavour to turn the worker into a capitalist, as though this is a thing to be avoided.

In almost all cases of Co-partnership the

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business has first been built up by private enterprise and it is practically impossible for this to be otherwise, especially in any business requiring wide technical, commercial and scientific knowledge. Co-partnership must, therefore, be looked upon as an auxiliary partnership and not a method which may be adopted as an alternative to the present method of the genesis and development of a business enterprise.

As in profit-sharing, Co-partnership appeals to the steadier class of worker and a factory where these are in the majority should always be able to pay good dividends.

The Labour Co-partnership Association makes the following claims for this principle :

- (1) The worker shall receive, in addition to the standard wages of the trade, some share in the final profit of the business or the economy of production.
- (2) The worker shall accumulate his share of profit, or part thereof, in the capital of the business.
- (3) The worker shall acquire some share in the control of the business in one or both the two following ways :
  - (a) By acquiring Share Capital, and thus gaining the ordinary rights and responsibilities of a Shareholder.

- (b) By the formation of a Co-partnership Committee of workers having a voice in the internal management.

In his paper on "Co-partnership," read before the Society of Arts on March 17th, 1926, Col. J. H. Boraston remarks, "Every employee whom the Company was willing to accept as a co-partner—and he was not accepted unless he was recognised to be deserving of the privilege of co-partnership—if he was willing to sign on for a definite term of service (usually 12 months, but with a minimum limit of 3 months) became entitled, when the accounts were made up and the profits of the business ascertained, to a bonus of 3 per cent. on his wages . . . but he is only entitled to one-half of it in cash. The remaining half is accumulated in the hands of trustees at 5 per cent. interest ; until the amount standing to the employee's credit is sufficient to purchase £5, or some multiple of £5, worth of stock. It is then invested in ordinary stock of the Company in the name of the employee."

A worker who receives £150 in wages thus receives, subject to the above conditions, £4 10s. bonus for the year, half of which is in cash if he so chooses, and the other half, i.e. £2 5s., must be placed to his credit and accumulated.

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Apart from the limiting conditions, compare the benefit with that of a firm who pays £24,000 additional wages to 450 employees in one year—the only condition being that they are employed at the works. Or another case where £5,000 was paid to 165 men in one year. These results are under the Co-operative Production System.

These, however, are results and do not affect the principle. If the profit-sharing element be cut out of Co-partnership, leaving the share of the worker to be determined by and in proportion to economy of production, there is no possible objection to the principle of Co-partnership and it opens the way to that larger control of industry on part of the workers which is so desired and desirable.

## IX

### *The Sliding Scale*

THIS is not a method of payment for output, nor is it a bonus scheme. It is a method of altering wages in relation to the selling price of the article. If the average selling price over a period of three months increases or decreases, wages during the following three months increase or decrease in a definite proportion to the selling prices of the previous three months.

It is in the nature of profit-sharing but is more satisfactory to the workers because it is quite possible for prices to increase and yet the Company may show a loss instead of a profit. It links together the interests of both employer and employee in obtaining the best prices for the article.

It is a general principle in industry that the more the production per man-hour the cheaper the article may be sold, with the result that the article comes within reach of a greater number of consumers, which means more orders, more work and more workers. Under the Sliding Scale method of wages adjustment this would

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mean that the worker would have his wages reduced *pro rata* to his increased output, therefore it is to his interest to reduce his output and keep his wages high.

The practical result of any method of wages payment is of far more value than any amount of theorising as to what the result ought to be. In the case of the Sliding Scale the result is curious inasmuch as it has been a great and unqualified success in the Steel Plate Industry and a failure elsewhere.

## X

### *Co-operative Production*

FROM these descriptions of methods of payment of wages one may form some idea of the value of a System that will tend to abolish all this industrial strife and dissatisfaction and place industry on an efficient and healthy basis. It may at first sight seem hopeless to find a System that will bring about good feeling and mutual interest between all workers, that will induce the workers to put forward their best efforts to increase production, and that will give them substantial increases in earnings—all without pressure from the management.

The Priestman-Atkinson System of Co-operative Production, however, achieves this end, and it is restful to turn from the methods described to one which brings peace and trust between all parties instead of suspicion, jealousy and recrimination.

To begin with, it must be emphasised that it is a practical System which has been introduced into many factories with the most satisfactory results. It is not just a benevolent suggestion



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which may or may not prove feasible or satisfactory. Nor is it a palliative scheme subsidised by the Government for overcoming temporary industrial difficulties or embarrassments. As already stated, for ten years it has been in operation and is as successful now as in any period since it began. In other cases it has been in operation many years with similar success.

What is there in the System that brings about this result? To answer this question some comparisons with the foregoing methods and some special features inherent in the System may be tabulated :

The Standard of production is set by the men themselves, not by the Management or by a Rate-setter.

There is no rate fixing.

There are no rates or times to be cut.

The workers get the full benefit of their increased production.

Production is measured.

Production is calculated periodically, usually every four weeks.

There is a clear and definite incentive to every worker to increase his production.

There is a keen interest in the quality and quantity of output.

The workers suffer directly by restriction of

output as this means they lose all possibility of a bonus.

It is to every person's interest to do his best.

The workers help and instruct others who are in difficulties.

Though good and bad workers receive the same percentage of bonus on their wages, the bad workers improve or leave, which introduces a better tone and gives the workers control over the internal *personnel* of the factory.

There is a constant tendency for good workers to drift into the factory and bad workers to drift out.

There is no limit to the production of any individual.

There are no " fat " jobs or " lean " ones ; the conditions level up all jobs.

There are no jealousies and every man may do the work for which he is best fitted.

The workers are their own disciplinarians and the foremen can attend to routine and organisation instead of urging the workers.

The workers see that all wastes are cut out as far as possible, especially waste time.

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There is goodwill and confidence between man and man and between the men and the management.

Bonuses are in direct proportion to the united efforts of the workers.

Bonuses are payable every four weeks.

The only effect on wages is to increase them, day-rates being guaranteed.

Any suggestions made by the workers are to their direct benefit.

The System brings "industrial peace" into the factory.

The fairness of the basis appeals to all.

There is greater interest in the management and its difficulties and a desire for better organisation.

The factory becomes one homogeneous organisation working diligently but happily and smoothly towards one end, namely, economical production under conditions mutually advantageous to all concerned.

It will be noted that the Standard Production is not based in any arbitrary manner on what some person or department thinks the workers ought to be able to do, nor is there any jugglery with prices or times in order to enable "a worker of average ability" to earn 33½ per cent. above his day wages.

The Standard is set on an output which the

workers themselves have produced during some previous period. A period of at least twelve months is usually taken for this and the period selected is as nearly normal in output, nature of product, number and class of workers, hours worked, etc., as can be obtained.

It is assumed that if the workers have actually produced this amount of work during a long period without any incentive whatever to produce more, then they can greatly improve their output as a whole by greater individual effort, by helping and instructing each other, by organisation amongst themselves, by cutting out wastes, by suggesting improvements. This means they can produce much more than that production which has been taken as the Standard. That this assumption is correct is not only obvious but has been proved over and over again by the results of the Systems that have been put into operation.

This feature of the workers setting their own standard is one which engenders confidence at the very beginning of the System.

The Standard is the total output of the whole factory during the Standard Period. This output is reduced to Points and there is no individual job to be specially priced or timed. The value of the output must reach a certain number of these Points during every hour the

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men are at work if they are to reach the Standard Production per hour. If they produce more, they receive extra wages. This Point method is one of the most important factors in the System as will be seen when the details are described. It is mentioned here because it is something the men can clearly understand and it enables them to know exactly how the System works.

It is obvious that there is no check on the work of any single individual. Results are calculated at the end of the month and these results are the combined production of all the men. Therefore there are not only no times or prices to be cut, but every man may do his best and if he produces much more than an average worker this is to the benefit of himself and every one in the factory and there cannot be any invidious comparisons between the work of one man and another. Each and every one may do his best without prejudicing the job or penalising his fellow-worker.

The figures of output, the Point Values, the number of hours worked by all the men, and the Point Value per hour, are all open to the inspection of the Workers' Committee. If there is no Committee, one must be formed for this purpose. This right of inspecting output records again creates confidence in the System, and

when the monthly meeting takes place it always leads to a discussion of how matters are proceeding, what work is likely to come in, what difficulties there may have been in any particular job and how they have been met, what may be done in getting the work out, and many other matters—all informally discussed but of enormous help not only in actual production and organisation, but in creating a sympathetic atmosphere of mutual interest and benefit throughout the works and offices.

Though the bonus depends on output it will be seen that it is by no means "payment by results" within the usual meaning of that expression. As already stated, there are no times or prices on the jobs and the bonus is paid to every worker in the factory. As every person receives the same percentage on wages it is to each person's interest not only to work to the best of his ability and capacity but to help others in every possible way. It replaces individual effort by team work and co-operative effort, and as all contribute to the production so all share in the benefits that accrue from it. All employees are included without exception—managers, clerks and labourers, as well as those engaged more directly in production.

The jealousies between the different departments of the staff and the friction which so

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commonly exists between the works and the staff tend to be eliminated when this System is in operation. It is quickly realised that smooth running means direct returns in bonus payment, and when all the workers on both staff and in the works have a common interest they soon discover the futility of obstructing the work of others, and the advantage of giving all the help they can. They discover, too, that the other man has his good points, after all.

The increased production that follows the introduction of Co-operative Production must not be taken to imply that there was a deliberate restriction of output previously. The incentive of increased wages under a satisfactory System brings out the latent energies of the workers, energies that would never have appeared otherwise even under the most martial management. And in addition there is the desire of the workers to express themselves in their work and in relation to their fellow-workers. This desire results in diligence, in increased skill, in suggesting better methods and processes, in mutual help—all of which is inhibited under other methods of wages payment.

G. D. H. Cole, in his "Payment of Wages," says, "The systems of output bonus by which a whole shop is paid a bonus on the production of the whole shop are infinitely preferable to

any of the systems of individual payment by results. Individual payment by results, however it is safeguarded, inevitably tends to the weakening of the collective bargaining power of the workers, and to the setting of one man's hand against another's. This is true in some degree even of the cotton industry, or in industries in which closely regulated systems of payment by results exist. It is true far more where the element of individual bargaining enters largely, as in engineering and other skilled crafts. A collective system, at any rate, does recognise the group as a unit, and does establish a common solidarity among the workers belonging to the group. By a collective system is here meant not simply a pool among a number of skilled workmen, but collective payment to a whole workshop, even where the workers in it are engaged on different parts of jobs or on different jobs."

This System of Co-operative Production fulfils the above condition and solves the difficulties mentioned. It is the most practical demonstration of the statement "each for all and all for each" that has ever been put into successful operation in connection with industry as a whole.

In his Report of 1887 to the Scottish Miners' Federation, of which he was the Secretary,



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Mr. J. Keir Hardie remarks: "Co-operative Production, under State management, should be our goal, as, never till this has been obtained, can we hope for better times for working people."

This System, being a method of payment of wages, obviously applies to all industries under any conditions, no matter whether the management be under private, municipal or State control.

## ***PART II***

### **THE PREPARATION OF A SYSTEM OF CO-OPERATIVE PRODUCTION**



## I

### *Standard Period*

IN order to determine the Standards on which a System is to be based, a certain period is selected and the production and hours worked during that period form the basis for the Standards.

This is called the *Standard Period* and should be as long a time as possible. In some cases the data necessary for ascertaining the relative Values are not in existence, or may be obtainable for a very short period only, or they may be in a form which must be modified before they can be of service. As a rule the period should be at least one year, but it is better to select two years, not necessarily consecutive. In one case a period of five years was taken.

No matter what period is taken, however, the conditions should be as nearly as possible those which will obtain when the System is in operation. In other words, the period should be one of normal production and must be carefully selected in order that it may represent

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the production of the workers under normal conditions without any incentive to increase production beyond those which are usually found under day rates of wages. Also, it must be a period of normal trading, orders being reasonably constant according to the nature of the business, and dividends on capital being about the average. If all these conditions are not obtainable for a definite period, a general average may be ascertained by comparing different periods during which production, the nature of the work, profits, trade, the number of employees, etc., were normal.

It is difficult to find a period which has not some exceptional features. For instance, short time may be worked, or for some reason the works may be closed down for a longer or shorter period. Again, there may be breakdowns, strikes, etc., and these must be considered and given their proper relation and value in estimating the normality or otherwise of the Standard Period.

It must be kept in mind that after the System is introduced much greater interest will be taken by all concerned in the general prosperity of the works or factory, and this will have a steadying influence on production. Deliveries may be depended on with the natural consequence that orders will be more regular. There

will be much less opportunity for those grievances which inhibit the flow of work and there will be no strikes except those of a general nature which affect the whole trade. All this means that the irritations and difficulties which are more or less constant under ordinary conditions will give place to a general satisfaction which will be reflected in steadiness of output. For these reasons, then, care must be taken to consider every irregularity which occurs during the Standard Period, together with the bearing which these irregularities have had on output during that period.

Consider for instance the question of short time. The workers know quite well when work is not coming in freely, and the tendency is for them to slacken their efforts—an invariable practice under the day-work system. The consequence of this is that for some time prior to working shorter hours or the works closing, the output per *man-hour* is considerably reduced. Again when men are re-engaged after a period of idleness it takes some little time before they get into the run of the work. This delay in getting into the routine is especially the case when a man is entirely new to the work or the factory. This, again, means a reduction of normal output per man-hour, and Values per man-hour must therefore be increased

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because the System assumes that conditions are normal.

This selection of a *normal* period is emphasised because false values may easily be obtained if the period is in any way abnormal. In one case it was found that the period selected by the Company was not comparable with a period of similar duration four years later. Though the working conditions and the nature of the work were the same, the production was over 30 per cent. more during the later period than in the period first suggested for determining the Standards. In another case, a period was taken which seemed to be quite accurate but it was found on investigation that the nature of the work had changed and therefore labour values for the period first suggested were useless for purposes of the System.

The ratio of indirect to direct producers must be carefully checked to determine whether this is normal. This also applies to the ratio of non-producers to others. The importance of this will be dealt with when describing how the Standard Points per Man-hour are obtained.

If there is any uncertainty about the figures which form the basis, or of the data from which the figures are calculated, there should be a test period of, say, three months before the workers are informed that the System is to be

put into operation. During this test period the production should show neither increase nor decrease with reference to the Standards. If there is a difference, this must be investigated and the figures modified if necessary, though this requires extreme care.

Where no figures whatever are available, values may be determined on the basis of normal estimates over a certain period. These may be obtained from the Order Book and from factory records of time, output, wages paid, etc. A System calculated on this basis must be tested for several months and constantly checked by Actual and Standard Production before it is put into operation.

Alternatively, observation of a current period will enable a basis to be obtained, but safeguards must be provided against the possibility of restriction of output or other abnormal circumstance.

A correct System cannot be built up on an inaccurate basis. This may seem an unnecessary remark, but it is sometimes difficult to make people understand that data must be accurate. Some persons think it clever to provide false figures and estimates, and those in subordinate positions, especially if they think they ought to have been consulted, seem wilfully to mislead the investigator or to withhold essential



figures or information. "Let him find out!" seems to be their motto.

This adds enormously to the difficulty of getting a correct basis and sometimes whole sets of figures and calculations have to be discarded because some important detail has been omitted. To "suffer fools gladly" is an essential part of the mental equipment of the investigator. This is not a complaint: it is only a warning to those who intend to adopt the System without seeking outside assistance for ascertaining the Standards.

## II

### *Classifying the Product*

AFTER the Standard Period has been selected, a list of all articles or materials manufactured or produced during that Period must be provided in order that they may be put into different classes. Every article must be included and a check must be made between the hours on the Time Sheets and the hours on the Job Cards, the object of this being explained later.

How the product is classified depends largely on the nature of the work. In some instances, classification is by weight only ; in others by separating the articles into distinct groups and then classifying by weight within the group ; in others it is by size ; and yet in others by single articles regardless of weight. There are many other ways and every factory in every industry will have its own special classification, though in similar industries the general basis may be the same though the detail differs.

Thus the whole of the production is studied, analysed and grouped into types and then, if

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necessary, into classes or grades. In some instances the product is all of one type, iron castings for instance, and in such a case the castings will be classified into weights and the relative labour values ascertained for the different weights.

Frequently it will be found that there are two or more distinct types of product with different grades in each. In a crane works the product may be classified into main groups such as electric, steam, hydraulic and hand cranes. Each group will be sub-divided and steam cranes may be separated into overhead, locomotive, jib and wall cranes. A third division may classify steam overhead cranes into different powers or types. Each group is dealt with as far as need be, and in this manner the analysis and classification is made.

Let us examine another case. In a soap factory there may be several distinct departments carrying out work which is special to each department and which has no bearing on other departments except that the finished material of one department is the raw material of the next. One department may be employed in cleaning and grinding bones and extracting the fat, another in making pure soap, a third in cutting the soap and packing into different weights and different kinds of packages, another

in making glycerine. These main departments may have subsidiary ones for making various grades of soap or for perfuming.

Again, in a heald and reed making factory there may be distinct departments for reed making and heald making, the two having nothing whatever in common except that the product is used in connection with weaving textile fabrics.

In any industry and in any factory an analysis of the product in this manner will enable the articles to be placed into groups suitable for ascertaining the labour values. Products which pass through more than one process may be classified either according to the final condition or according to the condition in the different departments. It is a matter for individual consideration how the classification should be made, but where possible the final Schedule of Point Values should be based on the product as it is delivered for shipment to the customer.

The following have formed bases for classification : weight, length, single articles, groups of articles, pieces, square yards, gallons, armature size, tons displacement, costs, selling price, value of goods packed, hours (as units), etc.

The final classification may, and probably will, need adjustment when the hours worked

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on the articles are brought into consideration. In some cases the weights, if this basis be taken, may need re-grouping after the time worked on the individual articles has been ascertained and compared. The following table shows the classification finally determined for six different works manufacturing the same kind of product. The initial classification was the same for each, but in every case it had to be adjusted to suit the circumstances.

I.	II.	III.	IV.	V.	VI.
Up to 7 lbs.	Up to	Up to	Up to	Up to	Up to
28 "	28 lbs.	14 lbs.	14 lbs.	28 lbs.	28 lbs.
1 cwt.	56 "	56 "	28 "	56 "	56 "
2 "	1 cwt.	2 cwt.	56 "	1 cwt.	1 cwt.
Over 2 cwt.	3 "	4 "	2 "	4 "	2 "
	7 "	8 "	4 "	4 "	4 "
	12 "	8 "	8 "	8 "	8 "
	Over 12 "	20 "	20 "	1 ton	1 ton
		Over 20 "	40 "		2 "
			Over 40 cwt.		4 "
				8 "	8 "
				Over 8 ton	
					20 "
					Over 20 tons.

In Case I the production was of a light nature and in Case VI it was of a heavy nature, but the kind of product is the same in every case and a comparison shows that a classification for one factory cannot be used for another even in businesses of a similar nature.

In some factories there may be classes of articles which cannot be included in a general classification for some reason or other. In such cases there will be a general classification for the standard articles and a special classification for those which cannot be included in the former group. These special articles will often be indicated at the outset by some particular feature, but when making a diagram of production times they will then become evident if there has been no previous indication that they are not standard products.

Sometimes, again, orders will be received which include special products. These are not included in the Schedules and therefore no Point Values have been allotted to them. Values must be ascertained by one of the methods to be described later (see page 125).

It will thus be seen that the classification of the products and the hours worked per unit have a distinct bearing on one another for purposes of this System. It must be borne in mind that whatever the product may be does not affect the

principle. All that is required is to separate the articles into an arbitrary classification having as its basis the type of product and the number of hours worked per unit, these units being, as before stated, weights, single articles, yards, etc.

One of the commonest remarks made when this method of classification is mentioned is : " Oh, but in our case this is quite impossible ! " Yet in nearly all cases an investigation will show that when similar products are grouped and the labour values ascertained, they will fall into natural classes along the lines indicated.

In some workshops practically all the articles manufactured are made to drawings or special designs, no two orders being alike. This offers no insuperable difficulty. One does not find furniture produced in an engineering shop, or a steamship in a dye-works. In every workshop the type of product is the same, however much it may differ in detail, and in getting out quotations the labour costs must always be estimated. In connection with any individual order, a comparison of past estimates with actual labour costs shows how far estimates are accurate. If estimating is reasonably accurate—and it must be if the goods are to be manufactured competitively and profitably—a basis of production for purposes of this System may be determined from an analysis and comparison of these figures.

### III

## *Standard Point Values*

THE Determination of Point Values for the different classes of articles results in the *first Standard*, namely, the Standard Point Value per article, ton, yard, etc.

The object is to reduce the time spent on all articles to a standard man-hour basis. An article requiring four man-hours to be spent on it will have four times the Point Value of an article requiring only one man-hour. By "man-hour" is meant the number of skilled man-hours spent on the article: four man-hours therefore may mean one skilled man for four hours, or two skilled men for two hours, or three skilled men for one and one-third hours, or one skilled man and one unskilled man for two and two-thirds hours (where the unskilled man's time is equal to half the time of the skilled man; skilled man,  $2\frac{2}{3}$  hours plus unskilled man,  $2\frac{2}{3} \times \frac{1}{2} = 1\frac{1}{3}$  hours, the two added making  $2\frac{2}{3} + 1\frac{1}{3} = 4$  hours).

It is necessary to be clear about the meaning of Point Values. These bear an exact proportion



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to relative labour values. An investigation may show that an article takes 25 hours to manufacture, another takes 10 hours, and a third, 2 hours. It would be easy to assume that one hour equals one Point, in which case the Point Values would be 25, 10 and 2, respectively. But there are reasons why this simple method cannot be adopted and it is necessary to multiply all labour values by a constant in order to arrive at the real Values. This constant may be any number, say, for instance, 8, in which case the above Point Values would be 200, 80, and 16, the proportion remaining exactly the same. Thus, Point Values are not labour values though they are exactly proportional to them and labour values must obviously be obtained before Point Values can be found. How the constant is derived will be shown later.

If in any factory the proportion of output of different classes of goods remains the same, and if the production per man-hour also remains the same, then there is no need of relative values or Point Values at all, no matter what differences there may be in the product. In such a case the "straight tonnage" or the "per article" basis may be adopted; that is to say, one value per ton, lb., yard, article, etc., may be given for the whole product and

increased production will be measured by the tonnage, number of articles, etc., multiplied by this one value.

It is very rarely that such a case as the foregoing can occur. Even when there is only one product, as, for instance, the output of a blast furnace, the amount of production depends to some extent on the nature of the ore, fuel, fluxes, air pressure, atmospheric conditions and so on, so that even here one value per ton would not represent a correct figure for labour per ton. The standard figure would be modified according to the conditions mentioned and every charge would have a different value per ton. It could, of course, be arranged on an average over a period by noting the tonnage and hours worked and finding the relation between the two. In this case the men would gain or lose according to whether the accumulated effect of the factors mentioned was in their favour or against them.

There is another possibility of error in the straight tonnage basis. If during the Standard Period there has been a good deal of heavy work—say, an exceptionally large order for a class of heavy goods requiring comparatively little labour per ton which is not likely to be repeated—then on a straight tonnage basis

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there would be a high production for the period. Subsequently, perhaps for several years, this would not recur and the tonnage produced relative to the hours worked would be low and superficially it would seem as though the men were restricting output. The Point Values correct all possibility of this kind of error, and the more variable the nature of the articles produced the greater the necessity for obtaining accurate relative values in hours per unit. When these are obtained it does not matter in the least what class of work is being produced. No matter whether the work be all heavy, or all light, or any proportion of heavy and light, the Point Values represent the effort necessary to produce each unit.

Consider the following example. Four classes of product are being made with the following relative values :

Class A	-	-	-	-	50	points	per	unit.
Class B	-	-	-	-	25	"	"	"
Class C	-	-	-	-	20	"	"	"
Class D	-	-	-	-	10	"	"	"

Here we find that 1 unit of A is equal to 2 units of B, these equal  $2\frac{1}{2}$  units of C and 5 units of D, so that for each hour spent on producing a certain quantity of D, five hours must be spent on producing the same quantity of A, two and a half for B and two for C.

If the whole of the workers concentrate on the manufacture of A they would manufacture only one-fifth the quantity they would produce if they were all engaged in manufacturing D. It is evident that if all these classes are being produced at one time, or if only one class is being produced, then if the quantity of each class be multiplied by the Point Value of that class and the results added the total Points will show accurately the amount of work produced.

The following examples show the necessity for accuracy in determining these Point Values :

Consider first an instance where the proportion of output in the different classes remains always the same. Then, as was stated above, the relative labour values or Point Values do not matter.

### EXAMPLE I.

1A.	Stand- ard Output	Point Value.	Total Points.	1B.	Stand- ard Output	Point Value.	Total Points.	Propor- tion of Output.
Class A	50	10	500	Class A	50	10	500	1
Class B	100	5	500	Class B	100	8	800	2
Class C	150	2	300	Class C	150	3	450	3
Class D	200	1	200	Class D	200	4	800	4
Total Points pro- duced - - - 1,500				Total Points pro- duced - - - 2,550				

Note that the Standard Output is the same but the Point Values differ. Now, assuming

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that production is increased *in equal proportion* in each class, the following will be the result :

### EXAMPLE II

2A.	Actual Output	Point Value.	Total Points.	2B.	Actual Output	Point Value.	Total Points.	Proportion of Output.
Class A	150	10	1,500	Class A	150	10	1,500	1
Class B	300	5	1,500	Class B	300	8	2,400	2
Class C	450	2	900	Class C	450	3	1,350	3
Class D	600	1	600	Class D	600	4	2,400	4
Total Points produced - -			4,500	Total Points produced - -			7,650	

A comparison shows that the proportions are the same, that is, the proportion of 1,500 to 2,500 in Example I is 1 to 1·7, and the proportion of 4,500 to 7,650 in Example II is also 1 to 1·7. Again, the proportion of 1,500 to 4,500 is 1 to 3, and the proportion of 2,550 to 7,650 is also 1 to 3. So that no matter what the Point Values may be, and no matter how many different kinds of articles are being manufactured, if the *proportion of output* of the different classes is always maintained the result is the same. In other words, the whole of the product may be given one Point Value per ton or article, and beyond multiplying the total quantity of all goods produced by the Point Value—which may be 1—no calculations are needed and relative Point Values have no significance.

## STANDARD POINT VALUES III

But if the proportions between the quantities manufactured differ in the different classes, as they almost invariably must do, the case is entirely altered, and the example will be extended one step further to demonstrate this. Observe that the Point Values in all three examples, 1A, 2A and 3A, are the same, and those in 1B, 2B and 3B are the same, though those in A differ from those in B. But the proportion of output is the same in Examples I and II, while it differs in Example III.

### EXAMPLE III

3A.	Actual Output	Point Value.	Total Points.	3B.	Actual Output	Point Value.	Total Points.	Proportion of Output.
Class A	150	10	1,500	Class A	150	10	1,500	1
Class B	100	5	500	Class B	100	8	800	$\frac{2}{3}$
Class C	300	2	600	Class C	300	3	900	2
Class D	700	1	700	Class D	700	4	2,800	$4\frac{2}{3}$
Total Points produced - - 3,300				Total Points produced - - 6,000				

The proportion is now 3,300 to 6,000, which is 1 to 1.82 instead of 1 to 1.7, and this Example III shows that one set of the above Point Values is incorrect and the production represented by one set of these values would be entirely inaccurate.

This example deals with small figures, but where some hundreds of workers are employed it will readily be seen that inaccuracy in the

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Point Values is a most serious matter. It results in either large bonuses being paid which have not been earned, or in low bonus, or even in deficits, although the workers have been putting more energy and intelligence into their work. Correct relative values are therefore essential if the basis is to be a fair one to both parties.

The relative labour values are obtained by ascertaining the number of hours spent on the different articles. If this information is not in the desired form it may be obtained from the Time Sheets or Job Cards. For purposes of illustration a basis of cwts. will be assumed.

The first classification may take the following arbitrary form :

Class 1	-	-	-	-	All work up to 1 cwt.
Class 2	-	-	-	-	„ „ 2 „
Class 3	-	-	-	-	„ „ 6 „
Class 4	-	-	-	-	„ „ 13 „
Class 5	-	-	-	-	„ „ 30 „
Class 6	-	-	-	-	„ over 30 „

While this classification is arbitrary, there must be a definite purpose in selecting these figures. First, it is almost always the case that the lighter the work the more man-hours *per cwt.* must be spent on it, and that gives us the first selection of weights for each class. This is modified by a rough examination of

the hours per cwt. on the different articles. If there is great variation in this, then the above classes may have to be split up into smaller groups. It is very easy to select an arbitrary classification, add together the weight of all the articles coming within the classes, find the hours worked on that class and then, by dividing the total hours by the total weight, to ascertain the hours per cwt. of each class. But this would give no indication of the variability within each class, if any, nor would it show any abnormal products. Indeed, there are cases where such a classification would show a quite fallacious result for purposes of this System.

In one case the hours per cwt. on the above basis appeared to be five, but this was in excess of, instead of being less than, the class of lighter weights which preceded it. An examination of the articles within the class showed that the class contained a group of special products with a value of eight hours per cwt., and after this group was extracted the value came to a little over two hours per cwt., which followed the natural curve of hours per cwt. for the whole production. In this class therefore there were normal and abnormal products and it is necessary to examine the hours spent on every article in order to obtain a correct result.



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The exact weight of *each article* and the time spent on it must be noted and the hours per cwt. ascertained from these. An inspection of the differences will then show any departures from the normal. If a diagram be plotted of these articles showing weights on the one scale and hours on the other the abnormal articles will be clearly indicated.

It depends on circumstances whether abnormal articles should be eliminated or not. If these are only occasional they may be included, but if the diagram shows any *grouping* of articles around a centre which is apart from the normal curve, this must be investigated, and it will usually be found that this group has some special feature which accounts for the anomaly and it must have a special Point Value allotted to it. We need not consider this further for the moment.

Assuming the hours per cwt. of all articles in the classes to be normal, the total weight of all articles in each class is divided by the total hours spent on them, and the result shows the labour value in hours per cwt. for that class. A series of labour values is thus obtained for the different classes.

This value is for skilled labour only and the question of unskilled labour must be considered before an accurate labour value can be

obtained. This is sometimes a very simple matter where the proportion of skilled to unskilled labour is usually the same within small limits. The unskilled labour may then be ignored and will only appear in the calculations when the Point Value per man-hour is being determined.

In most cases the ratio of unskilled to skilled labour varies on different jobs or classes, and if it is at all possible, either by Time Sheets, by verbal information, or by more or less accurate estimates to find the amount of unskilled labour spent on the different individual articles, such labour should be included in ascertaining the real labour value of each class.

The importance of this will be evident if we examine the time spent on two different articles of the same weight, one of which can be manufactured in ten hours by a skilled man with a more or less indefinite amount of unskilled labour employed in bringing supplies, occasional help, etc., while the other, to be done in the same time, necessitates a skilled man with one unskilled labourer in constant attendance, together with the same amount of indefinite labour as in the first case. Assuming the value of unskilled labour to be half that of skilled labour, then the real relative labour values are 10 hours for the first job and

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15 hours for the second. If this additional unskilled labour is not included it is obvious that if a large number of the second kind of job has to be done, the workers would lose heavily on this class of work as more hours of unskilled labour would be spent on it than in the first case.

In factories where the work is of a mixed description this is a very important point. For instance, in one case a great portion of the output was in connection with colliery engineering, but there were side lines such as the treatment of brattice cloths, gutta-percha manufacture, and a merchanting business which included the rough machining of joists and steel sections. All these side lines were to be included in the Co-operative Production System and all the men were to receive the same percentage of bonus on wages, which meant bringing the values of all these side lines into correlation with the whole of the skilled and unskilled labour on the engineering side. It was impossible to determine values for the whole works on the basis of the skilled labour in the engineering section only, and it meant a careful calculation into the relative value of the labour on the side lines to that of the skilled labour before Point Values could be set for the side lines.

It will be evident that the real values of the different classes of work can easily be misrepresented if the proper incidence of labour has not been determined.

When the hours per article, cwt., etc., have been ascertained a Schedule of these hours may be drawn up. An inspection of this Schedule might show that a certain amount of reclassification is necessary if the preliminary grouping be too wide or too narrow. Also, as already mentioned, it might be found that some items or groups of items in the first classification are of quite a special nature, inasmuch as the hours spent on these items are much above or below the normal for that class.

It may be simpler to eliminate extreme cases altogether and to determine the average without them, but this must be very carefully done, otherwise it may throw the values out of balance. It is only necessary to eliminate such extremes when it is very unlikely that this work will ever be repeated, in which case these articles may be put in a special group temporarily and a special value given to them.

It is not usual for extreme cases to occur, because it would be more economical for the Company to give this work to an outside firm with better facilities for executing it. It is an expensive and often an unwise experiment

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to attempt to do work for which the machinery, equipment and methods are unfitted, especially if it means competition with others who are possessed of the means and organisation to do it more economically.

To obtain the exact hours spent on the different items is a long and tedious process, and one demanding great patience and accuracy. It goes hand-in-hand with the classification of the product, but the latter must be done first, even roughly, in order to provide a basis on which to work.

In the event of the hours per unit not being available, it is necessary to find a basis from some other source. While such a basis is not so satisfactory as hours per unit, yet it may prove to be sufficiently satisfactory to enable the relative Point Values to be obtained. In one case the selling price of the article was taken as a basis. After eliminating certain items which form part of the price, the remaining figure bears a definite relation to the labour cost of the article, and this gives a fairly satisfactory measure of the relative amount of labour necessary to produce the different classes.

In determining the Point Values it must be kept in mind that these must be such as will enable the workers clearly to understand what values are placed on the different classes and

how they are derived, and also they must be in such a form as will facilitate calculation, thereby enabling the System to be put into operation without the necessity of increasing the clerical staff.

Greater accuracy in relative values can be obtained, but for the reason mentioned in the last paragraph and for other reasons, it is undesirable. For instance, after the weights of all the jobs relative to the hours worked on each have been plotted on a diagram, a curve may be obtained about which these jobs are grouped. A formula based on the weights and hours may then be obtained empirically which will closely approximate to this curve. By applying this formula to every job after the System is in operation, a very precise value may be obtained of the Points produced. But, although extremely accurate, this would entail far more calculation than would be justified by the result, and instead of such a formula one definite value is given for all jobs in each class. When applied to a large number of jobs taken over a period this one value will be to all intents and purposes as accurate as the formula—certainly it will be so for purposes of this System. But the longer the Standard Period, the more the articles taken to form the basis, and the wider the classification, the

more accurate the Schedule of Point Values will be.

There may be a great difference between the highest and lowest Point Values. In a bridge-building works the highest was 960 and the lowest 13 per ton ; in a soap factory the highest was 5,000 and the lowest 100 per ton ; in a billiard table factory it was from 4,150 each down to 11 per dozen—and there may be any number of values between these extremes.

## IV

### *Standard Production per Man-Hour*

WHEN the Schedule of Point Values has been drawn up, it is necessary to find the total production during the Standard Period in terms of Points. Usually, the number and kind of articles produced are forthcoming without difficulty, though there are cases where a special investigation has to be made in order to find out exactly what goods have been delivered during the Standard Period.

When this list is drawn up, the articles are all put into their different categories in accordance with the classification shown in the Schedule. The number of articles, or total weight, in each class is multiplied by the Point Value of that class, and the production of goods of that particular class is thereby obtained in Points. This is done for every class and the totals added, the result being the total production in Points during the Standard Period.

The next step is to find the total number of



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Man-hours worked during the same period. It must be understood that Man-hours means skilled Man-hours. If there is a grading of labour (see page 105), then all hours must be converted to skilled hours in order to find the total Man-hours.

The data from which to find the hours will probably be available, but if not, the hours which have been paid for as shown on the Time Sheets, and the number of persons on the Staff multiplied by the number of office hours in the period—say 40 hours per week—will give this figure.

At this stage in the calculations a check may be made between the number of hours shown on the Time Sheets and the hours spent on the jobs according to the Job Sheets. The two should agree, after deducting the time of those workers whose hours are not booked to special jobs—service men, labourers, etc. If there is any discrepancy between these hours it should be investigated. Extra payment for overtime is a frequent cause of difference.

When the total Man-hours have been ascertained, the total production in Points divided by the total hours will give the Standard Points per Man-hour.

*This is the most important figure in connection with the System.*

It has already been mentioned that the figure for the Standard Points per Man-hour rarely, if ever, proves to be a whole number when the relative labour values of the products are derived directly from the hours spent on them. Where the work is large or heavy, there is usually more than one hour per unit spent on it, in which case the Points per Man-hour is a decimal figure, an actual figure in one System being  $\cdot 035$ . On the other hand, where the work is small and several units may be completed in one hour, then the Points per Man-hour will be one or more plus a fraction. Very rarely indeed will it be a whole number.

Both the workers and the persons who have to deal with the figures much prefer to deal with a whole number for the Man-hour Standard, and for this reason the Standard Points per Man-hour are converted to a number arbitrarily fixed. Between this arbitrary figure and the actual figure, a constant is obtained by which all the relative Point Values must be multiplied in order to bring them into line with the new figure for the Standard Points per Man-hour.

The following example illustrates this calculation :

The total Points divided by the total hours gave  $\cdot 46$  as the Standard Points per Man-hour. The arbitrary figure for the Standard Points

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was 10 per Man-hour. If the figure 10 be divided by  $\cdot 46$  we get the figure 21.8, and this is the "constant" for this System. It means that the actual value of  $\cdot 46$  has been multiplied by 21.8 in order to get the figure 10 for the Standard Points per Man-hour. All the relative values of the different products—that is, all the figures in the preliminary Schedule of Point Values—must be multiplied by 21.8 in order to make the two Standards consistent.

The following is another practical example :

Product.	Actual Output.	Hours each.	Total Hours.
Class A - - -	150	10	1,500
Class B - - -	300	5	1,500
Class C - - -	450	2	900
Class D - - -	600	1	600
Total Hours on Direct Production			4,500

The total hours of all the workers in the factory both on direct and indirect production amounted to 5,850. The ratio between 4,500 and 5,850 is,  $\frac{4,500}{5,850} = \cdot 77$ . If we assume the figure 10 to be the Standard Points per Man-hour, the constant 13 is derived, thus,  $\frac{10}{\cdot 77} = 13$ . The hours spent on each class of article, that

is, the relative labour values, are multiplied by this figure, and this gives the Standard Point Values for the Schedule. The calculation will then appear as follows :

Product.	Standard Output.	Point Value.	Total Points.
Class A - - -	150	130	19,500
Class B - - -	300	65	19,500
Class C - - -	450	26	11,700
Class D - - -	600	13	7,800
Total Points Produced -			58,500

By the above calculation, 5,850 hours have produced 58,500 Points, which equals 10 Points per Man-hour. The proportion between .77 and 4,500 is the same as that between 10 and 58,500. The final Schedule of Point Values will be as shown above.

After the System is in operation, new work may be undertaken for which no Point Value is given in the Schedule. In order to determine Point Values on such jobs, one or other of the following methods may be adopted :

1. The amount of labour may be estimated and the corresponding Point Value determined. In this case the work must be watched, the times taken and a check made so as to verify the Point Value.

2. The hours spent on approximately similar work will help very considerably in determining the Point Value. Of course, the job would be automatically incorporated in the Schedule unless some special feature made it necessary to put it in a special category, but nevertheless, it is almost certain that in some respects it will be similar to jobs which have already been produced, and a comparison with these will probably enable a Point Value to be determined with a reasonable degree of accuracy.

3. The Point Value may be based on the hours spent on the actual job plus a percentage equal to the bonus for the period. This is the most accurate method, but it is open to the objection that the men might restrict output on this particular job in order to get a high Point Value for it. But as every hour spent on the job is debited with the Standard Points per hour, the longer the time on the job the greater the debit and the lower the bonus, so that little will be gained even if this restriction be attempted, which is very unlikely.

All kinds of new or of odd jobs may have a Point Value allocated to them by one or other of the foregoing methods.

Occasionally the question will arise whether

to deal with the output from all departments as a whole or whether to keep the departments isolated and pay each department the bonus earned by that department. In the latter case any non-producing department connected with the whole works will be paid the average bonus of all the producing departments.

By splitting up the departments it means that any department may be dropped without the System being affected. The following is an example of this :

	Department 1.	Department 2.	Department 3.
Productive Labour -	10,000	20,000	50,000
Other Labour - -	50,000	20,000	10,000

The total Productive labour is 80,000 and the total of the other labour is also 80,000, the proportion being 1 : 1. If department 1 drops out, the proportion is 7 : 3 ; if departments 1 and 2 drop out, the proportion is 5 : 1.

If the Standards have been based on the whole of the production the dropping out of one department throws the whole System out of balance, and new Standards must be obtained.

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If each department is dealt with by itself then one can be dropped out, and it will not affect the remainder.

It is rarely that such a case occurs, and as a rule it is much more convenient to deal with production as a whole.

The question of whether to include the Staff hours in the total hours worked or whether to consider the Staff separately must receive consideration. To some extent this depends on the nature of the business, but as the result of several years' experience in introducing the System into different industries, the writer has come to the conclusion that it is better not to include the Staff hours with those of the works when calculating output. The reasons are as follows: If the Staff hours be included, then the total production for the Standard Period is divided by the total number of hours worked by all the employees during that Period in order to find the Standard Points per Man-hour. If, subsequently, there comes a time of trade depression, general or local, then as the number of Staff hours remains about the same and every such hour is debited with the Standard Points per Man-hour, a situation is quickly reached when the debit on account of the Staff hours will prevent any possible chance of a bonus being paid to the workers even

though they have earned it. The following illustrates this :

(1) Actual Production - - - - 260,000 points.

Hours worked by producers - 20,000

Hours worked by staff - - 2,000

Total - - - 22,000

Standard points per Man-Hour, 10.

Standard Production, 22,000 × 10 220,000 „

Surplus production - - - 40,000 „

Bonus payable, 18·2 per cent. of Wages for period.

(2) Actual Production - - - - 90,000 points.

Hours worked by producers - 8,000

Hours worked by staff - - 2,000

Total - - - 10,000

Standard Production, 10,000 × 10 100,000 „

Deficit in Production - - - 10,000 „

Bonus payable, *nil*. Deficit carried forward, 10,000 points.

In the second case there is a deficit of 10 per cent., but a glance at the figures will show that the production is 90,000 Points and the Standard Production for the hours worked *by the producers only* is 80,000, which would give the producers a Bonus of 12½ per cent. instead of a deficit of 10 per cent.

The Staff hours should therefore be kept separate, and the Staff bonus will depend on the Standard Staff Proportion of hours worked compared with the proportion of Staff hours to Works hours during any period after the System is in operation. The Standard Staff



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Proportion is the proportion between the Works hours and the Staff hours during the Standard Period. In the example given above this is one-tenth.

The method adopted by the writer is to convert the Standard Staff Proportion into a Point Value per hour. In the case just mentioned the Standard Points per Man-hour for the workers is 10. The proportion of hours worked by the Staff to hours worked by the workers is 1 to 10. Therefore the total number of Points produced divided by the hours worked by the Staff will give a Point Value per hour of 100. This is the Standard Point Value per Man-hour for the Staff.

The great advantage of this method is that during normal times the Staff receive the same Bonus as the workers, but as soon as short time is worked then if the number of hours worked by the Staff remains the same, as it usually does, the total Points produced soon fall below the Standard for the Staff, and the Staff receive no bonus, while at the same time the total Points produced may exceed the Standard for the workers because they are working less hours.

This is as it should be, because the workers are evidently still keeping up their effort and receiving a Bonus for the time worked, but

the overhead expenses are still going on, and the Company could not reasonably be expected to pay a Bonus to the Staff during a period of short time in the works. The whole is automatically adjusted by means of the Staff Point Value, and the benefits and privileges received by the Staff in other directions justify this arrangement.

The Staff does not, under any circumstances, receive more percentage of Bonus than is paid to the workers. Foremen should be included with the Staff, and their hours should not, as a general rule, be added to those of the workers for purposes of this System.

## V

### *Modifications of Standards*

THE Schedule of Point Values is not fixed and immutable. Any System to be successful and to be fair to both sides must be subject to modification according to circumstances. This applies also to the Standard Points per Man-hour.

It is true that the Schedule is rarely modified, and the Man-hour Values more rarely still, but there are occasions when changes are necessary, and the System is sufficiently elastic to allow the inclusion of such changes without the basis being in any way altered.

These changes may be due to the introduction of new methods, or new machinery, or new processes, or new organisation. If an old shop be remodelled with better lighting and heating, facilities for quicker transport, new power cranes instead of hand cranes, more modern machinery, better supplies, greater stocks, and any other factor which will help towards increasing production per hour, these must receive careful attention, and the Schedule of Point

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Values must be modified either in part or as a whole.

Consider the one item of a power crane to replace hand cranes or trolleys. A little calculation will show that this will replace a certain number of unskilled labourers, but in making the calculation there must be a debit and credit side to the account. If the crane replaces six labourers, it also adds one or two cranemen, and it will need a certain amount of skilled mechanical attention both for upkeep and for accidents and replacements, as well as an expenditure in power. In making changes to the Values, only the *net* result must be taken into account, and the alteration in this case would not be the time of six labourers but their time less the time of the cranemen together with the time of the skilled men in repairs, etc., and other expenses converted into terms of time.

Where alterations must be made it is always better to alter the Schedule of Point Values rather than the Standard Points per Man-hour. In the latter case the whole of the men are affected, and it is only rarely that this can happen, because the circumstance which makes such a modification necessary must be one that concerns the whole factory. This also applies to a modification of the Schedule of

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Point Values as a whole. Nearly all changes can be brought into the System by a modification of the Point Values on certain articles, care being taken to ascertain the real saving and not the apparent one. The case of the introduction of a power crane has just been given, and the case of installing a multiple drill machine may be considered. Such a machine, it is claimed, may do as much work with the attention of one man as four will do on single drill machines. On the face of it there is saved the work of three men. But the first cost of the machine must be considered, and the attention such a machine requires is much greater than that of four single machines. It requires more setting up, which means the work of a skilled man, and a complicated machine of this nature needs more repair and inspection than a single one, besides which it is not in commission so continuously. All these things must be taken into account in arriving at a correct figure with which to debit the Point Value of the articles machined by this new tool.

It is frequently necessary to try out a machine or process before attempting to alter the Point Values. During this preliminary stage the Point Values may remain for the work done under trial, or, what is better, both the work and the time spent on it may be eliminated

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from the calculations of output until the new Value has been determined.

It is obvious that some alteration to the Point Values is necessary when new machinery, processes or methods are introduced, otherwise there would be no object in making any improvement whatsoever. The men are in exactly the same position as before with regard to the opportunities of earning bonuses, and it means greater economy of production.

In one factory the Point Values were altered for some of the articles five times in three years. The effort of the workers was apparently the same throughout and the average Bonus for the last six months of this period of three years was almost exactly the same as that of the first six months, although many of the Point Values on the articles had been reduced. Had the Values not been modified the workers would have received a higher Bonus for no increase in effort, and the price of the article could not have been reduced. Payment for extra effort beyond that needed to attain the Standard production was therefore the same at the end of the period of three years as it was when the System began, thus proving the correctness of the Standards, the correctness of the modifications to the Point Values, and the maintenance of effort on part of the workers.

## VI

### *Difficulties of Investigation*

ALTHOUGH the description of how to prepare a System will enable those who are directly interested in introducing the System into their own works to draw up Schedules, calculate Standards, and define the conditions of working, the matter is not quite so simple as it appears. The difficulties are not so much determining Standards from data, but in obtaining correct data and in being quite certain that everything has been taken into consideration.

It is obvious that the investigation cannot be undertaken by the Directorate, or even the higher Management. It must be delegated to someone on the office staff. The first difficulty that arises is for the investigator to know just what he is after. He rarely knows and there is no one who can inform him intelligently. Then, even if he knows what information is needed, he may not know how to obtain it ; and if he does know, the information may not be available in a simple form, and he may find it impossible to convert it to his use. The

consequence is that the investigation is not properly carried out ; the Schedules may be incomplete or of doubtful accuracy which makes the Standards equally inaccurate. If the System is put into operation, this may mean the necessity of altering Values when errors are pointed out, which is not at all satisfactory.

In the meantime, the person who makes the investigation has been taken off his own work and he will either have to work overtime to bring his work up to date, or other persons will have to take it over, and this interferes with the routine and the efficiency of the office. The expense of all this is far more than that entailed by engaging some outside authority whose special business it is to prepare the System.

The personal element, also, is sometimes very difficult to deal with. The person preparing the scheme has no authority beyond his status in the Company and those above him frequently resent his interference and will refuse information or give incomplete or inaccurate data or figures. The opinions of managers and directors must be considered and these sometimes vitiate the result as the person must do as he is told. It follows that when the time comes to explain the System to the workers it is difficult to get them clearly to understand how the Standards have been deduced and this leads to suspicion.



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In any case, the fact that the System has been introduced by the management is frequently a cause of distrust on the part of the men.

The result of all this is that the System does not get a fair chance of proving its value. Loyal co-operation is lacking when it is put into operation, and if the results are not satisfactory the principle of the System is blamed, not the faultiness of the basis.

It is quite true that many firms have introduced the System of their own accord and it has worked quite well. The object of this book is to enable others to do the same, and the foregoing is but to emphasise the necessity of giving full authority to the person preparing the System and to see that the data and the calculations are accurate to the smallest detail. Then, assuredly, success will follow.

When all the work of investigation is finished, the Schedules drawn up, and the Standards ascertained, the System is in its final form and is ready to go into operation.

It is usual to explain the principles of the System to the whole of the workers assembled together, but where the number runs into thousands an *ad hoc* Committee is selected by the workers and the System is explained to this Committee, the members of the Committee then discuss it with the workers associated

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with each of them. Any question of difficulty or misunderstanding is dealt with at a subsequent meeting before the System is actually put into operation.

The whole of the figures for the Standard Period, the calculation of the Standards and the conditions under which the System is to be operated are placed before the workers or their representatives so that they may have an opportunity of studying and criticising them.

As already explained, the System is operated on a monthly basis, either a calendar month, or every four weeks, usually the latter, in order to avoid either a few odd days in the month or a five-week month. Whatever Bonus may have been earned is paid during the following month, either in one sum or in four equal weekly payments.

## VII

### *Diagrams of Results*

It will no doubt be of interest to illustrate the results by two or three diagrams of actual Systems.

Fig. 3 shows a highly successful System. There are no deficits at all and the average is much above the Standard Production shown by the zero line. The fluctuations are very considerable and are due to the nature of the product. All of it was of a heavy nature with the consequence that dispatches were great in some periods and small in others; hence the fluctuation. But it is this constantly varying bonus that adds greatly to the interest in the System, and the workers never know quite what they will get, though they usually know when a period has been good or bad from the amount of work dispatched or in progress.

Fig. 1 is a more typical diagram. Here again there are no deficits but the average is not so high and the fluctuations not so great. At this factory the average for three and a

FIG. 1.

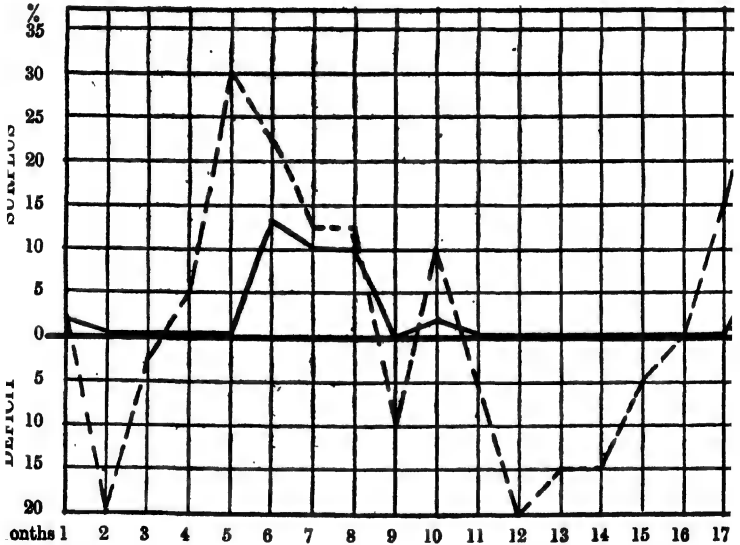
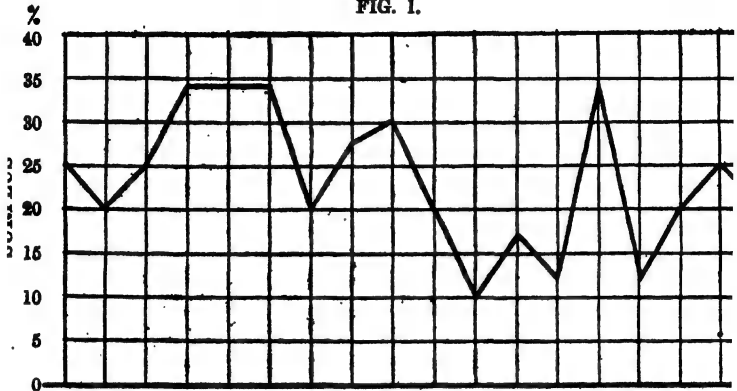


FIG. 2.

The zero line is Standard Production.  
 The full line is Bonus paid on wages.  
 The dotted line is Actual Production.

Diagram 1 is a typical diagram.

Diagram 2 is a system with an incorrect basis.

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half years has been about 23 per cent. above the Standard Production.

The diagram in fig. 4 is one of the most interesting that has been obtained in connection with this System. It illustrates the effect of the System during fluctuations of trade and shows how circumstances affect production. Also, it indicates how the employees respond to the incentive of increased earnings when the basis is satisfactory, no matter what the condition of trade may be.

During the eighteen periods covered by the diagram we find the following varying circumstances :

- Works closed,
- Cessation of orders,
- Short time,
- Breakdown of machinery,
- Restriction of output,
- Normal conditions of work,
- Increase in the numbers employed.

The *first two* periods show an increase above Standard Production of 20 per cent., while the *third* shows an increase of  $27\frac{3}{4}$  per cent. The bonus, as explained, should be 20 per cent., 20 per cent., and  $27\frac{3}{4}$  per cent., but that actually paid was 20 per cent., 20 per cent., and 25 per cent., the balance in the third month being carried forward to the credit of the workers,

FIG. 3.

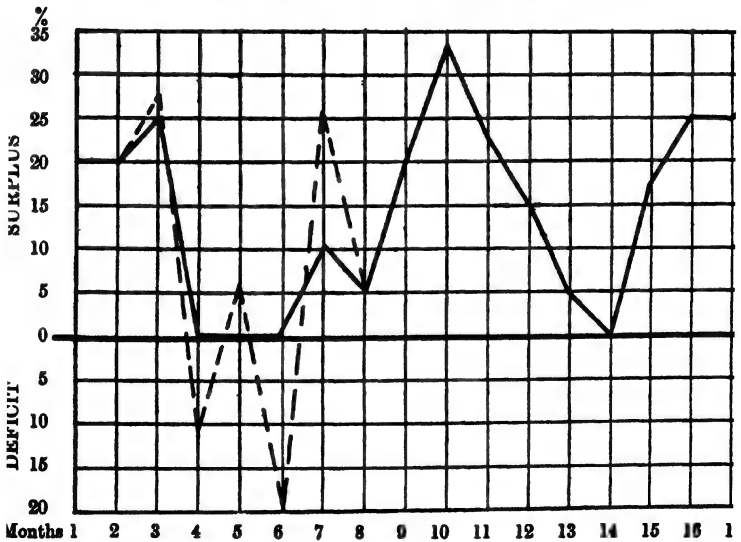
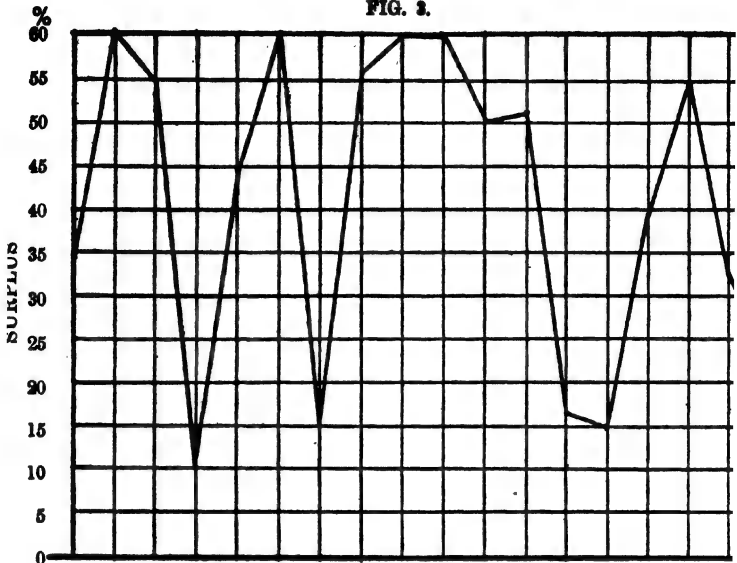


FIG. 4.

Diagram 3 shows a very successful System.

Diagram 4 is a very interesting System which was successful under many diff

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this being done only for convenience in calculating the amount to be paid on the wages of each man.

The *fourth* period shows a deficit, the Actual Production being below the Standard Production. This deficit was due to the closing of the works consequent on a reduction of orders. Efforts were made to complete all the work in hand by the end of the third period and this partially accounts for the increase from 20 per cent. to  $27\frac{1}{2}$  per cent. for the third period.

During the fourth period it was necessary to keep certain men employed in addition to the Staff, though there was no production, and according to the conditions under which the System was operated every hour worked had debited against it the Standard Points per Man-hour. Hence the deficit, which amounted to  $16\frac{1}{2}$  per cent. This deficit had to be cleared off before any bonus was earned in subsequent periods.

The works were closed for about two weeks and then reopened on short time until orders increased. It is common experience that on resuming work after a workshop has been closed, production is never normal for some days and this had its effect on output during this fourth period, besides which, the labour of the men employed was not represented in

deliveries to the customer until after the end of the period. The small credit balance of  $2\frac{1}{2}$  per cent. from the third period was offset against the  $16\frac{1}{2}$  per cent. deficit.

In spite of the deficit against them, the men worked well and during the *fifth* period produced a surplus of 6 per cent. above the Standard. This was not sufficient to clear off the deficit and there was no bonus for the period, but the deficit was much reduced.

The *sixth* period shows a falling off in production, this being due to a breakdown of machinery which practically held up production for some days. The question arose whether to close the works or to keep them open and employ the men on odd work, largely unproductive. It was decided to keep them open and though the Points were piling up against the men, they were not discouraged. They realised the impossibility of getting a bonus but they were still receiving the Trade Union rate of wages and were just in the same position as before the introduction of the System. The deficit for this period is the measure, to some extent, of the "human element" brought in by the Management. Had the works been closed there would certainly have been no deficit—but the men would have been unemployed.



During the *seventh* period trade improved and the men took advantage of it with the result that they increased production by  $26\frac{1}{2}$  per cent. above the Standard for the period. Of this,  $16\frac{1}{2}$  per cent. cancelled the deficit and a bonus of 10 per cent. was paid. Everyone was completely satisfied with the result, the deficit being cancelled.

The *eighth* period was the most serious and disappointing since the System was introduced. Production fell to only 5 per cent. above the Standard when there was every reason to believe it would be substantially increased. Both the men and the Management were disappointed and inquiry showed that some of the direct producers had a grievance and this low output was the result. It is interesting to note the effect of this grievance on production and it is a profound lesson in works psychology. Much could be written on this point, but it is sufficient here to point out the practical result—a decided reduction in output where a considerable increase was anticipated.

What is more interesting is that the grievance was not against the Management or the conditions of working; it was an imaginary grievance between some of the men which was never clearly explained, but it proves how production suffers when the men are not

working harmoniously together. The Works Committee asked the Management to deal with the men concerned. The reply was that the System was as much, or even more, to the advantage of the men than of the Management; that under it the men became their own disciplinarians; that disaffected men who brought down the bonus of everyone by reducing output or preventing its increase ought to be dealt with by their fellow workers without the aid of the Management or other outside party; and that the remedy lay in the hands of the workers themselves, namely, to exclude such men or to bring them to a more reasonable frame of mind.

The *ninth* period shows a bonus of 20 per cent.; the *tenth*,  $33\frac{1}{2}$  per cent.; the *eleventh*,  $22\frac{1}{2}$  per cent.

On inquiry being made about the grievance, it was stated that the men concerned were now working away quite happily and the whole matter had been settled quite satisfactorily without any outside interference.

With the *twelfth* period the increase fell to 15 per cent., with the *thirteenth* to 5 per cent., and with the *fourteenth* to zero. This was due to the engagement of many more workers. The new workers were engaged on work of a heavy character, taking a long time to complete, and

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therefore it did not come into account until two or three months after the men were engaged ; consequently, while all their time was debited with the Point Value per Man-hour, very few Points were being credited for their output. The result appears to be a reduction of output, whereas the output was being piled up, as it were, in the work in progress.

The output of the new men became apparent during the *fifteenth* period, the output in excess of the higher total Standard output due to the larger number of workers being 15 per cent. The *sixteenth* period showed an increase of 25 per cent., the *seventeenth*, 25 per cent. ; and the *eighteenth*, 30 per cent.

The increase in the number of workers between the twelfth and the fifteenth periods was more than double, this being an indication of how the System tends to increase employment. The average increase in production for the thirteen periods of normal production is practically 20 per cent. It must be remembered that these are increases in excess of the whole production of the works previous to the introduction of the System, and all Directors and Managers will appreciate at once what this means in the saving of overhead expenses.

The System was introduced into this factory in the middle of 1923, during a period of great

trade depression and uncertainty. The result is a most striking testimony to its value under severe strain and adverse conditions.

An example of error is sometimes instructive, and the diagram, fig. 2, shows an instance of this. It demonstrates the necessity of considering every phase of a business and a full cycle of trade before making the calculations for the Standards. It will be seen that there was a small surplus during the first month, and a heavy deficit during the second. It took three months to cancel the deficit and there was a very large increase in production during the fifth month. Even this did not wholly wipe out the deficit and not until the sixth month was there a second bonus paid. The seventh and eighth months were steady and then follows another drop, then an increase which wiped out the deficit and produced a small bonus, and afterwards there followed seven months in which there was no bonus. The eighteenth month produced a bonus and the two subsequent months, though not shown on the diagram, gave even better results. But the System had become so unsatisfactory that it was suspended pending a revision of the basis.

This is an actual diagram, but it need hardly be said that the System was not prepared by

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the writer. It emphasises the statement made on another page that it is desirable to obtain the aid of someone experienced in preparing the System when it is decided to adopt it.

It must be mentioned in connection with diagrams of this nature that while they represent the amount of increased production per man-hour above the Standard, and also the amount of bonus, in percentage, paid to each employee, the actual figures in production *units* are not given. If there are ten men working in a factory their production above the Standard of say 100 articles may be 25 per cent., i.e. they produce 125 articles. Now, if 100 men are working in the same factory, and if these men produce 1,250 articles, they, also, are producing 25 per cent. above the Standard. The diagram will show that in both cases the production is 25 per cent. above Standard and that the men receive 25 per cent. bonus. But the difference to the Company between a production of 125 articles and 1,250 articles is enormous. In the one case the Company may be working at a loss because the overhead expenses absorb all the profit on 125 articles, while in the other, the overhead expenses are reduced very greatly and not only can a profit be paid, but the prices may be lowered and further orders obtained.

This point should be kept in mind when

examining this type of diagram. Referring to fig. 4 it is seen that in the third month there was an increase of 25 per cent. and a similar increase in the sixteenth month. But in the third month there were 2,800 cwts. produced and in the sixteenth month 6,573 cwts. were produced.

## VIII

### *The Effect on Overhead Expenses*

It has been stated that the saving to the Company is in overhead expenses, amongst other items. To illustrate this the following figures are given. They are not exact because expenses and wages do not always bear exactly the same relationship to each other during a period of increase, but the figures indicate how the saving is effected and, approximately, the extent.

Under ordinary conditions a Company produces, say, 1,500 tons of goods per annum and sells them at £100 per ton. The labour cost is assumed to be £35 per ton, material £35 per ton.

	£		£
Wages, 1,500 tons @		Sales, 1,500 tons @	
£35 - - -	52,500	£100 per ton -	150,000
Material, 1,500 tons			
@ £35 - - -	<u>52,500</u>		
Cost for 1,500 tons -	105,000		
Gross profit (30 per			
cent. of turnover) -	45,000		
	<u>£150,000</u>		<u>£150,000</u>

## EFFECT ON OVERHEAD EXPENSES 153

Assume an increase of 25 per cent. in production then

	£		£
Wages, 1,875 tons @		Sales, 1,875 tons @	
£35 - - -	65,625	£100 per ton -	187,500
Material, 1,875 tons			
@ £35 - - -	65,625		
	<hr/>		
Cost for 1,875 tons -	131,250		
Gross Profit - - -	56,250		
	<hr/>		
	£187,500		
	<hr/>		
			<hr/>
			£187,500
			<hr/>

An increase of £11,250 in the gross profit. As all overheads have been covered in the £45,000, this £11,250 is practically all available for dividends, or for reducing the price of the goods.



## IX

### *Relative Values and Labour Costs*

THE importance of giving relative values to the different classes of work is well exemplified in the following case of a foundry where castings from the lightest up to about 10 tons were produced.

After the System had been in operation three years an analysis of production was taken and this showed that the average weight of castings during a period of four weeks varied considerably, the lightest average weight for such a period being .89 cwt. and the heaviest 5.9 cwts.

Had one value per cwt. been given for all castings, it is obvious that when the average was low the men would get no bonus and when it was high they would get an excessive bonus even though they were in each case working to the best of their ability.

In this instance the castings fell into ten classes and the Point Value for the lightest

class was nearly eight times as much as that for the heaviest class, so that if the castings were all light, or all heavy, or in any proportion of light and heavy, the Point Values represented accurately the effort taken in production.

Bonuses varied from nil to  $33\frac{1}{3}$  per cent. and it is very interesting to learn that the labour costs were practically the same no matter whether the bonus was high or low. The greatest variation in labour cost never exceeded threepence per cwt. and usually it did not vary more than one penny per cwt. from month to month. This means that the workers received a bonus in exact proportion to their effort—they really determined their own wages.

The stabilisation of labour costs is a highly important matter in costing and estimating and this instance shows how steadily labour costs remained, not only during the variation in production as represented by the bonuses but also during considerable variations in the classes of castings produced, namely, from .89 cwt. per period to 5.9 cwts. per period. The statement was made that one could estimate for work with the Point Values as a basis and the result would be quite accurate.

It was further stated that the monthly return of production showed at once what was happening in the works, and if production fell, an

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inquiry at once discovered the cause ; usually it was due to work in progress in the nature of heavy castings, or to the lag following a holiday period. It is seen that the System acts as a barometer showing the state of the " bonus atmosphere " mentioned on page 198.

In the instance given above the work was of a comparatively simple nature, being one kind of product separated into ten classes. Where the products are much more varied the principles of the System become all the more valuable in rewarding the workers for increased effort, in stabilising labour costs, and in indicating the conditions, personal and general, obtaining in the works during any period.

***PART III***

**THE EFFECTS OF CO-OPERATIVE  
PRODUCTION**



# I

## *Creation of Confidence*

THE most noticeable feature after the System is in operation is the good feeling which exists in the works or factory between every one, no matter what their position or the department in which they are engaged. This is especially the case between the management and the workers as a whole. The System transforms the whole atmosphere of the factory from one of suspicion and self-interest to one of good feeling and the common welfare.

The workers take a personal interest in the progress of the firm and in the nature of the work, and they freely help each other instead of standing aloof. It is on record that after the System was in operation at an engineering works in the north, a skilled fitter was seen helping a boy to lift a riveter's fire on to a runway in order that the boy should not wait for a labourer to help him. In another case two turners called for the crane at the same time. The craneman did not know who to go to first

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and ten minutes later the foreman had to separate the two men.

Greater attention is given to matters that will increase output without extra personal effort. In the case of a foundry making light castings, the men quickly realised that by taking a little extra care in making the mould they could save wasters. The result was an increase of 15 per cent. in output by this extra care alone. The workers will make all sorts of suggestions for improvements in organisation and it is their right that these should receive attention. As it is to the interest of the management that these things should be done, because the management themselves benefit from the System, the chance of suggestions being put into practice is much greater than under former conditions.

Grievances, which are such a common feature in almost all factories, are much less common because the sources are automatically removed by the inclusion of all employees in the benefits of the System. Where they do occur, they are usually very real ones and are soon settled. Grievances between the men themselves are settled without reference to the management or to the trade union organiser, except in very rare cases.

Where a man is an incorrigible slacker he

soon finds it expedient to seek a job elsewhere. When all are receiving the day rate of pay it matters little to the men as a whole whether any particular man does his share or not; they may despise him but it is "live and let live" with them. When such a man is pulling down the bonus of all the others it is a different matter altogether and it is found in the great majority of cases that the slacker will begin to pull his weight rather than lose his job. But if he cannot be induced to do so, he goes. And it must be particularly noted that there is no complaint about victimisation as it is the general feeling of his fellow-workers that induces him to "resign."

As an instance of the changed relationship between the workers and the management, the following may be related: When the System was adopted the men were informed that their bonus would not be less than 10 per cent. while the System was in operation. That is to say, if they earned 5 per cent. they received 10 per cent. or if they earned 8 per cent. they received 10 per cent. while if they earned anything over 10 per cent. they received whatever they earned. This arrangement of guaranteeing extra earnings to the men is no part of the System and is not to be recommended, but the manager said that it was worth giving this guarantee in



order that the System may have every chance of success for a year ; if they did not earn the 10 per cent. throughout the year as an average increase above the Standard, then the System would be little or no use to them. The event proved that for two years the average bonus was  $22\frac{1}{2}$  per cent. Then came slackness in trade and many men were discharged. Those who remained were unable to earn bonus owing to the conditions, and the guaranteed minimum of 10 per cent. then came into operation as the firm considered it better to keep the System in existence even though no bonus was earned and though losses were being made. After a few months a deputation came from the workers to propose that the 10 per cent. bonus be abolished until times became more normal as the men knew the works was being run at a loss. This proposal was made without hint or suggestion from the management and came as a surprise to them. Such instances prove the merit of the System in changing the feelings between the workers and the management.

During an exceptional depression such as the one through which we are passing there is a tendency for bonuses to diminish and sometimes to cease altogether. There is a two-fold reason for this. In the first place the men are afraid of working themselves out of a job as

mentioned on page 204, and in the second because in almost every factory, unless it is entirely closed down, there must be a certain number of men at work even though there are not enough orders to keep them fully employed. In such circumstances it is quite impossible for the men to earn a bonus. In some cases they are piling up a deficit and it is a question of policy whether this deficit should be cancelled or not when trade becomes more normal. Under ordinary seasonal or cyclical variations of trade these deficits should not be cancelled, but during such a general and prolonged depression as that of recent years, which is no fault of employers or workers, it may be desirable to cancel it ; in other words, to suspend the System until times improve. In many cases the men are only too glad to be kept at work and they do not mind the loss of bonus.

We have found on many occasions that men have been kept at work because they are old servants of the Company and they have been put to all sorts of odd jobs in order to keep them employed. It is obviously impossible for production to be increased above the Standard under such conditions as these and no one expects it ; it is a striking testimony to the "humanity" element brought into industry by the employers—an element we have found much

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more prevalent than many trade union officials care to admit.

When the System is in operation and more men are engaged, this sometimes results in a temporarily diminished bonus because the work of these new men will not come into account for several weeks, perhaps months, after they are engaged. A reference to the Points per Man-hour will show that every man is debited with so many points per hour and if his work is not credited to production until the following or some subsequent period, the debit points will bring down the bonus for the current period. The bonus rises again immediately the work of the new men is credited to production, see the diagram on page 143. In factories where small articles are produced the work of every man is credited within the period of production and there will be no fluctuation of bonus due to recently engaged persons. There may be some little diminution owing to the new persons being strange to the work, but this will not be very great.

This fluctuation of bonus impresses the men still further with the connection between effort and reward. If the return is long delayed, as when the work of newly engaged men is of a heavy nature, it may be worth while to separate the time and production of these men in order

that those who are already increasing their production may not seem to be at a disadvantage. In this case the recently engaged men will not receive any bonus until their production is credited and as the accumulated effect will probably be large it may be spread over the total number of hours since they began work.

In crediting production, care must be taken that the article is placed in its proper class otherwise a slight error may creep in. The following example will illustrate this: Where production is credited by weight, as in the case of castings, the lighter weights have a greater Point Value than the heavier ones, per unit. Assume the classification to be from 0 to 1 cwt., 1 to 3 cwt., 3 to 6 cwt., 6 to 12 cwt., 12 to 20 cwt. Then, if a group of 24 castings weighs 72 cwt. 0 qr. 7 lb. they would be put in the 3 to 6 cwt. class because the average weight is over 3 cwt. But if the total weight be divided by 24, each casting weighs 3 cwt. 0 qr. 0 lb. 4 oz. Now, it is impossible for *every* casting to weigh this precise amount and if there is a difference in the weights some will weigh more than the average and some less. Those which weigh more will be put in the 3 to 6 cwt. class but several of them will fall below 3 cwt. and must be placed in the 1 to 3 cwt. class which will have a greater Point Value per cwt. than the next

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heavier class. It will be seen that the workers will be penalised by putting them all into the 3 to 6 cwt. class. On the other hand, had the 24 castings weighed 71 cwt. 3 qr. 21 lb., the workers would have received an advantage.

Taking the average throughout the year, any difference due to this grouping would be negligible, but a case occurred where a large number of castings were on the borderline and it was not probable that this order would be repeated. An adjustment was made by crediting half the total weight to one class and half to the other. It is very rarely that this sort of thing occurs, and it cannot occur at all where the product is classified by articles and not by weight or measurement.

## II

### *Co-operative Production combined with other Methods of Wages Payments*

It will be evident that the basis of Co-operative Production differs very considerably from all other methods of payment of wages and of schemes for rewarding the workers, and for this reason it can be carried on side by side with them.

It may be introduced, for instance, into a factory where Profit-sharing is already in operation. In such a case the Standards are ascertained as for an ordinary case of day work wages payment and the System is operated without change. All it means is that more profits will be earned and at the same time the workers will be receiving all the benefits of Co-operative Production. This combination of Co-operative Production and Profit-sharing is ideal for the employees. On the one hand they receive a direct and immediate reward in proportion to their increased energy, and in

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addition they share in any profit, over a certain minimum, which may be made.

Where Systems of individual payment by results is in operation the System may be adopted because in such factories there is usually a large number of persons employed who cannot be put on piece rates and to these the System will apply. The method is either to calculate the Standards as though there were no piece rates, or to bring production to a day rate basis and calculate Standards on that. In the first case the whole production is calculated relative to the whole of the hours worked and the Standards obtained as described. In the second case the excess production due to payment by results is converted to hours (or wages paid above the day rate earnings are converted to hours) and these hours are added to the actual hours worked and this figure is used for the Standard hours worked when calculating the Standard Production per Man-hour, the whole production being taken into account as before.

Piece-workers can also be included in the System with the day workers. The overhead expenses in a factory are covered by the average production. If the average production be increased the excess is, in effect, free from overheads and carries a much higher profit than does the production up to the average. It is

## COMBINED WITH OTHER METHODS 169

out of this larger profit that a bonus is paid to the piece-rate workers in the form of a percentage, corresponding to the percentage of production above the average, on earnings in excess of the day rates—the “piece-work balance” as it is sometimes called. Standards are calculated in the usual way and the following shows what bonus will be paid :

Assume Production above Standard to be	0 %	10 %	20 %
Pieceworkers earning only day rate receive - - - - -	0	0	0
Pieceworkers earning 10/- above day rate receive - - - -	10/-	11/-	12/-
Pieceworkers earning 30/- above day rate receive - - - -	30/-	33/-	36/-

This is 10 per cent. or 20 per cent. on the piece-work balance of 10s. or 30s. respectively.

Where both day-rate and piece-rate workers are included in the System, the bonus would be paid on the whole of the earnings of those working on day rates and on the piece-work balance, as above, of those working on piece rates. By this means the highly productive worker will receive an additional percentage on the earnings above the day rate and the result will be, in effect, a differential piece rate, as will be seen in the above table.

But it is not a permanent increase in the



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piece rate. The rates remain the same and the differential rate, which is exceedingly easy to calculate, is only paid *each month* if during that month the Standard Production of the whole works has been exceeded. The differential rate is in direct proportion to the increased output, a small increase carrying a small increase in the rate and a greater increase carrying a larger increase in the rate. If there is no increase at all in the rate it is evident that the workers are not working above the Standard Production.

The advantages of this combination of day-rate and piece-rate workers are :

- (1) Every worker in the factory participates and helps towards increasing production per man per hour.
- (2) The lower skilled workers will be urged to earn higher wages.
- (3) There is a direct incentive to the works' service men to keep machines in order and to avoid anything that will interfere with the flow of production.
- (4) However great the increase in the highly productive workers' wages, the basis is such that all bonus increases come only through increased production above the Standard.

### III

## *Conditions of Operation*

No matter how nearly perfect a System of Payment of Wages may be, it can be rendered abortive unless the conditions making for success are observed. In this System of Co-operative Production there are less opportunities of error than in any other, and if the principles are properly carried out there is little or no chance of error creeping in at all. What is more, the confidence which is brought about by the System enables all matters to be discussed in a friendly atmosphere and any difficulty that may lead to possible unfairness is at once overcome.

The first condition to observe is that all questions arising out of the working of the System must be dealt with by the Management and the Workers' Committee together. These meetings clear away all suspicion and enable the different points of view to be appreciated, and a discussion of any point is cleared up quickly and to the mutual satisfaction of both sides.

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If there is no Workers' Committee in existence, one should be formed for purposes of this System. But the Committee, existing or to be formed, is only concerned in examining the basis of the System, checking the output each month, seeing that the calculations of bonus are made correctly, declaring the rate of bonus, and discussing with the Management any matters concerning the System or arising out of it. Whatever other functions or duties the Committee may have are quite apart from this System.

Any suggested alteration of Values is a matter for discussion, and the proposed alterations must be clear both as to the reasons for them and the extent of them.

Prompt attention should be given to any suggestions of the men for improving the conditions of work and especially for improving facilities for getting the work out. It is to the benefit of all that such suggestions should be adopted, assuming, of course, that they are reasonable and feasible. It will be found almost always that recommendations by the workers are practicable, obstructions and hindrances being brought to light that the Management never hear of under ordinary circumstances. Smoothness of running and avoidance of delays become general when the

System is in operation, and it is natural that the workers should know better than the Management just where the immediate difficulties lie. And again, it is always a great satisfaction to a worker when his suggestion has been adopted, even though he benefits little by it directly.

The principles of the System must be explained to the workers either in mass meeting or through a Committee appointed by them, and any difficulty or misunderstanding removed. Every individual worker should have the right to bring any matter personally to the Management in order to express his point of view and to get a decision. This is a condition always made in the Systems introduced by the writer and though it gives great satisfaction to the workers, it is very rarely that an individual takes advantage of it. When they know they have this right, they seem content to leave matters in the hands of the Committee, but without the right of personal appeal they would feel that they were too much in the hands of the Committee.

The method of arriving at the Standards must be explained to all the workers or to the Committee, and the period and figures on which they are based should be placed before them. Every month (or whatever period may be

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decided on) after the System is in operation, the Committee must have before them the figures of production and of hours worked, and must have an opportunity of making the calculations of output and bonus for themselves. They are almost always content to look over the figures and trust to the Management for the accuracy of the calculations. They know what has been despatched, and a few minutes' scrutiny of the output satisfies them that all is in order. The chief anxiety in the minds of the members of the Committee is to examine the figures in such a manner and to such an extent as to answer any question put to them by their fellow-workers.

The method of payment is one which must be settled before the System goes into operation. Usually the period is four weeks, making thirteen periods to the year, and the workers receive the bonus either in one sum every month or in four weekly instalments. It is better to pay the bonus in one sum every four weeks because it brings the benefit more clearly to the men. A sum of 10s. every four weeks is one thing ; a sum of £2 immediately after the bonus is calculated is another. Actually it is the same amount of money, but the one seems much more than the other ; also, a smaller weekly sum seems only an addition to

wages, whereas a larger sum each month is clearly over and above the weekly wages, and associates effort with reward much better than when the bonus is divided up into four weekly payments. Weekly payments were found necessary in one or two cases where bonuses were high, some of the men being absent for a time after the monthly bonus was paid—and when they returned to work their production for a day or two was not phenomenal in quantity or quality. Such cases are not common, and experience proves that the payment monthly is much more satisfactory, and it also simplifies the work in the counting-house.

It is necessary, of course, for the Management to reserve the right of rejecting any work that is not up to standard quality. As mentioned on page 209, there is an opinion that a System which has for its object increased production on a payment for output basis will increase production at the expense of quality. For this reason the right of rejection must be reserved to the Management, and by retaining this right any question of quality is out of the hands of the workers, as it undoubtedly should be. It is necessary to say, however, that in no case where Co-operative Production has been adopted has the quality of the work deteriorated. The probable reason for this is that it is to the

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general interest that quality should be at least as good as before the System came into operation, and therefore any worker turning out bad work comes in for general criticism. Or it may be that the pride of craft will not allow the workers to turn out inferior work. But the exact reason is not known, and it is sufficient that it does not occur. In one case it is stated that "from inquiries made wasters would seem to be less than before the System was introduced. That may easily be accounted for by the fact that it is not only in the interest of the works to turn out good work but also of the employees seeing that bad work of every kind has to be replaced and does not count in the excess on which payments are made." In another case the number of waste castings was 1 in 141 = 0.71 per cent., or by weight 1 in 95 = 1.05 per cent. for twelve months.

A deficit during any period must be deducted from any subsequent surplus before the balance of Points is credited for bonus. In view of the bonus being paid to all workers this deduction is an essential part of the System. Under an individual System it is not a matter of much moment, and each period, for instance, one week, may stand on its merits and any deficit may be cancelled as it would be but a small matter. For instance, a deficit of 10 per cent. on one

man's earnings is a matter of 5 or 6 shillings, but 10 per cent. on the wages of 500 men is too much to be cancelled, and besides this, if such deficits were cancelled the men would make no effort whatever to keep up production if they realised that a deficit for a particular period was inevitable. By deducting the deficit it means that the men must maintain their effort even during a bad period, because the more they relax their energies the greater the deficits to be subsequently wiped out. Every System put into operation is subject to this condition.

Standards will not be altered unless machines or methods are introduced with the object of increasing output. Any alteration or addition must be announced before it comes into operation. If possible the alteration to the Standard should be made when the machine or method is introduced, but if this cannot be done a period of probation or experiment must be determined.

It is obvious that any factor which results in a permanent change in the nature or quantity of Production must modify the Standard if the System is to continue successful.

The greatest care must be taken in determining the real effect of machines or methods. For instance, a machine may be introduced which, it is stated, will produce, say, five times



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as much work as under previous conditions, but the machine may need the attention of two men, and therefore the proportion is 5 : 2 and not 5 : 1. Again, the machine will need more attention from the maintenance side, and this also must be considered ; and the statement that the machine will do five times as much work as before probably means while the machine is at work. It will be out of commission for some time, either for repairs or tool setting, etc., and this again limits the real capacity of the machine. Other instances are mentioned on page 133.

In altering the Standard therefore, statements made about machinery must be very carefully confirmed by calculation or by experience before any alteration is made.

As mentioned in describing the method of calculating Standard Points per Man-hour, it must be clear who is to be included in the System and who is not. Usually everyone from the Manager downwards is included, but there are cases where the Manager and heads of Departments already receive bonuses on output, and these will either not come into the Scheme or, if so, their existing arrangements may be cancelled. Again, in some cases salesmen are included, and in others, where a commission is received on orders obtained,

they are not. Yet again, where some workers are engaged entirely on outdoor work, they do not come in the works' scheme as their production is not included in the Standards; they can be put on a System applying only to themselves. The point is, that it must be clear from the start whose time and production is to come into the scheme.

Arrangements should be made about any articles which are brought into the factory from outside. In some cases no work is done on these articles and they are left out of account, while in some others a certain amount of machining, fitting, etc., may be done. The Schedule of Point Values will have these items included as a rule, but it is well to have it clear how such articles are to be dealt with.

Where an employee falls sick, or leaves the employ of the Company for any reason, he receives the bonus of the period on his wages up to the time of leaving or falling sick. For instance, if a man be at work 10 days out of 22—or, say, 80 hours out of 176—and if the bonus for the whole period be  $33\frac{1}{3}$  per cent., he receives  $33\frac{1}{3}$  per cent. on 80 hours, and this is paid to him at the same time as the bonus is paid to the others. He is thus entitled to the bonus on the time he has worked, even though he has left the service of the Company.

## IV

### *Psychology and Ethics*

CO-OPERATIVE PRODUCTION removes that injustice and ill-will which has existed in industry since the dawn of the industrial revolution.

A great many schemes have been proposed to overcome the prejudices which have existed so long and which still exist in the minds of the workers against employers and the conditions of employment, but most of these schemes are based on the pious hope that by instilling into the minds of the workers the idea that the interests of the employers and workers are identical, the workers will accept the conditions uncomplainingly.

It is impossible, however, to bring about a better feeling merely by persuasion, and unless something very sound, practical and beneficial is proposed it is not likely that the workers will respond to these well-intentioned suggestions. They are quite as capable as the employer of understanding the position, and confidence cannot be created by rhetoric; it needs something more tangible to make

the workers feel that these suggestions are intended to be, and really will prove, to their advantage.

In this respect, Co-operative Production is of inestimable value. Its appeal is to everyone concerned in the endeavour to obtain greater economy in production. It demands collective effort and collective intelligence, and results in collective benefit. It introduces confidence, trust and sympathy between all parties. The suspicion which is so commonly found in industry is eliminated.

This was not the object of the System when it was first adopted. Its primary object was to get increased production on a basis which appeared to be fair to all those in connection with production, but after some months' operation the worker realised that he was in effect his own master, and feeling that he could put his trust in the System, he took it up enthusiastically. The result, in the words of one employer, was that the atmosphere of the works was changed "from hell to heaven," while in the words of a Trade Union official, "it removes any feeling of being twisted from the minds of the men."

When men begin to help each other it brings about quite a new feeling in the factory, as the foregoing remarks testify. Sympathy

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between the management and the workers means progress, and useful suggestions under these circumstances are put into immediate operation. There is no reason to withhold help to a fellow worker because of the fear of losing time, or of the criticism of a foreman ; a man will not lose time needlessly and any help he gives to another is to the advantage of all, the men being their own disciplinarians.

Under piece-work, premium bonus and other individual systems the appeal is to individual effort, which means every man for himself. Under profit-sharing there is no incentive to work harder or for one man to help another, any more than there is under day wages. But the difference between these methods and that of Co-operative Production need not be further emphasised.

It is claimed that the same results are obtained by driving force—that is, by bullying, policing, etc.—under day rates. Apart from the fact that this has been demonstrated to be false, the claim cannot hold good because there is no measure of the ultimate results of driving, in all its aspects. There is a huge expenditure of energy, with constant supervision, tuning up, fining and so on. And there are very few foremen who are not hated by some, at least, of the workers, whether the

hatred be deserved or not. Driving hard generates friction in humanity as well as in machinery. But machinery may be lubricated, while there is no lubrication between the management and the workers under such circumstances, and the machine is necessarily inefficient, energy being absorbed in friction instead of in producing useful work.

Undoubtedly the workers will always increase their production when working under a System in which they have confidence and which rewards them for their increased effort. The diagram, Fig. 5, illustrates this in the most striking manner. During the later phases of the great war it was in the highest degree essential that those workers who were manufacturing munitions for the men at the front should produce to their greatest possible capacity. They were appealed to on grounds of patriotism as well as of self-interest ; wages were phenomenally high, and every inducement that could be thought of was provided in order to get greater and still greater production per man. Matters became so vital that special pressure was exerted by the Government, and point A in the diagram shows how the men responded, by an increase of 13 per cent. in output. This was very satisfactory, and this output was maintained for about six months. Then Co-operative

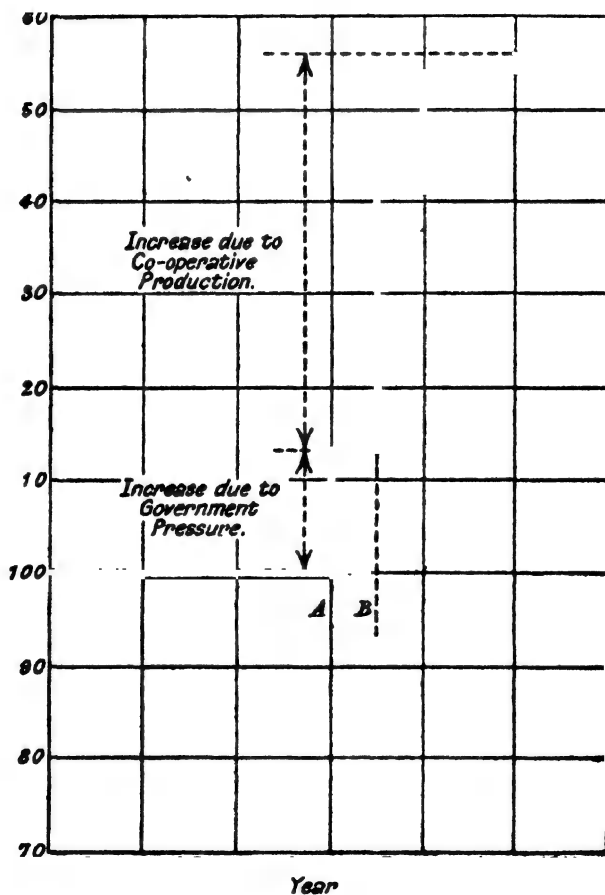


FIG. 5.

Relative effect of :  
1. Government Pressure.  
2. Co-operative Production.

Production was introduced and the result is shown at B—an increase of 56 per cent! No words can be as impressive as this diagram—and the production has been maintained at this high level ever since.

It is frequently stated that there is a “natural speed” for every worker and that any attempt to increase this speed results in strain or that the quality of work deteriorates. This is open to doubt. There is certainly an *habitual* speed, but this is capable of change according to circumstances. It may change in response to a negative or a positive stimulus. An indifferent foreman, or a hustling one, may bring about a net decrease in the habitual speed, whereas the incentive of a bonus under satisfactory conditions may result in a permanent increase in the habitual speed.

Sir W. Rowan Thompson gives particulars of seven machine men, the oldest employees in his works, who for many years had been producing under a bonus scheme nearly double the work they had been producing previously, when they were much younger men, under day rates. The highest producer was a man of 70 years of age. This indicates how habitual speed may be increased under the stimulus of a bonus. Had the former speed been a “natural” one, the subsequent speed was unnatural and the health



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and physical condition of these men ought rapidly to have deteriorated.

At the same time, there are undoubtedly some workers who work considerably faster and some who work considerably slower than the average, as was mentioned when discussing piece rates. But since the worker's speed is to some extent responsive to stimulus, a slow worker may be converted into a quicker one by a proper incentive.

Under the day rate of wages the "natural" speed of a worker has full scope, which means that he may go as he pleases so long as he satisfies the foreman. Co-operative Production provides an incentive to the worker to change the rate of working from his habitual to his optimum speed and this without the constant "speeding up" which characterises some other Systems.

The psychological effects may be summed up as follows :—

Workers and employers trust each other.

There is a fellow feeling in joining equally in production.

There is a better feeling between labourers and skilled workers.

The men help each other where possible.

Jealousies between men and between departments disappear.

The men work at their optimum speed and find much satisfaction in always doing their best

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without the necessity for a watchful foreman constantly supervising them.

The slack worker generally improves, but if he is incorrigible he leaves.

Men prefer to be in a Collective System. If they stand out they get no help and they cannot earn the full reward of their effort even under piece rates because they do not get the necessary assistance.

The elimination of the slacker means a better tone in the factory and automatically increases output because a productive worker takes the place of an indifferent one.

The men appreciate the advantage of everyone having a good all round bonus rather than a few workers receiving exceptionally high wages.

As the Standards are fixed by the work previously done the men cannot possibly lose by the System and the fairness of the basis encourages them to put their best into their work.

It is a great satisfaction to know that the bonus is not jeopardised even when the firm is losing financially.

The impossibility of cutting times or rates gives them a sense of satisfaction and security.

The men make suggestions and recommendations for improving the facilities and amenities of the factory.

The men take a greater interest in the management of the factory and appreciate manufacturing difficulties much more than before.

## V

### *Control by the Workers*

MUCH is being discussed at present about the possibility of the workers' control of industry. Generally speaking, this is only a vague desire on part of certain Trade Union officials and academical writers on industrial matters. Practical ways and means are left for future consideration and it is doubtful whether those who express this desire really understand what control means.

Very few manual workers have any desire for control ; most of them are quite content to be controlled and to be told what work they are to do. All they want is to have a straightforward job with satisfactory wages under good conditions, without responsibility and without the fear of being unemployed. Those who have a keen desire for control and who make the necessary study of conditions usually attain responsible positions and become leading hands, foremen, superintendents or managers.

The opportunities of control on the part of the workers as a whole are very limited and most of

the workers would not know what to do if they were placed in positions where they had to exercise authority. It would be much better to study the conditions of industry with the object of ascertaining whether there is any opening which will justify some measure of authority on part of the workers rather than to force control into unwilling or incapable hands. Such openings will rarely be found because control almost always means an expenditure of capital one way or another and where the capital is in the hands of a Directorate, which is almost always the case, there is no room for the workers to take over the functions of the Directors.

This system of Co-operative Production does, however, afford an opportunity to the workers to take a keen interest in the prosperity of the firm by whom they are employed. In the first place, they have before them all the figures relating to production on which the Standards are based and this brings them into touch with what the firm is doing both in regard to output and the time taken in production. In the second place, they very quickly begin to see the difficulties in connection with estimating for and obtaining, orders at competitive prices, and also how labour affects these estimates. They realise that as they increase production per man so overhead expenses are reduced and that

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prices may be lowered which means bringing more work into the factory and increasing employment, while the whole industry feels the effect of the stimulation in trade which follows increased orders.

Besides bringing about a sympathetic understanding of the difficulties of management, the workers' best opportunity of exercising control is found in their relations with each other, in the organisation of their own efforts and of their methods of performing the work. Under ordinary conditions they have no inducement to do this but where their Standards of output have been set by themselves they rapidly understand that every slight advantage is to their direct benefit and the accumulation of these improvements, however small, results in higher earnings quite apart from increased physical effort. It necessitates every worker taking an interest in the general effort and the control of the productive personnel of the factory is in their own hands.

Immediately after the System is put into operation practical suggestions are frequently made and often adopted. In one foundry suggestions were made with regard to the provision of moulding boxes, better arrangements for bringing sand and other materials to the moulding floor, the provision of gangways to simplify the transport of materials and castings

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to and from the moulding shop. This foundry has been in existence for a great many years and some of the moulders have been engaged in it for over thirty years, yet no one made any attempt whatever to improve the conditions until this System came into operation. There were certain improvements by the management, of course, but no suggestions from the workers.

At another foundry one of the moulders suggested a method of treating the mould before the metal was poured with the result that the surface of the castings was smooth instead of rough. Though the men obtained no benefit by this suggestion the satisfaction of producing a better article was a reward in itself. We have often noted the keenness of the men in producing good work and also their appreciation of good machinery with which the work is to be done. At a meeting in Glasgow the following comment was made on a works in the neighbourhood, one of the best-known engineering works in the world, " They have a splendid works, but the conditions are awful ! "

In order to show the stimulation of interest on part of the workers when this System is adopted, it may be mentioned that at still another foundry there were two moulding shops, one for light and the other for heavy castings. Owing to trade conditions the heavy casting

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shop had been closed for some time, the System being introduced while the shop was inoperative. Owing to the good bonuses they were getting some of the workers objected to the resumption of work in the heavy castings shop because they thought the lower Point Values for heavy castings might reduce the bonus and they suggested that the firm should concentrate on getting orders for the lighter classes of castings. It was impossible to act on this suggestion not only because light and heavy castings were ordered at the same time (the heavy castings having been obtained temporarily at another foundry) but because it was to the firm's advantage to obtain orders for any kind of casting up to the limit of weight they were capable of producing. Further, the men were wrong in thinking light castings paid them better than heavy ones; the Point Values give an equal reward for equal effort in every case. This was explained when the System went into operation, but doubt is hard to kill, and castings with the higher values per cwt. seemed to be more remunerative than those with the lower values.

When the heavy shop was put into operation and the men found they earned quite as much bonus as before, they were satisfied, but the incident shows how the System stimulates the

interest of the workers not only in their immediate work but in the policy of the firm. It shows also what would have happened had the workers been in control as they would probably have limited the foundry to the production of the lighter castings, whereas the opening of the heavy castings shop resulted in the engagement of nearly double the number of workers.

The workers' control, therefore, should be limited to matters where that control is likely to be beneficial ; that is to say, let them learn to control their immediate work and its conditions while endeavouring to obtain that better understanding of industry and commerce which will justify them in obtaining still wider control.



## VI

### *Fallacies Concerning Production*

THERE are several fallacies in the minds of the workers in connection with production. They are under the impression that any increase of wages under piece rates or other form of payment on output puts men out of employment. This has been dealt with elsewhere, see page 26.

The workers frequently object to labour-saving machinery on the ground that it leads to unemployment. They overlook the fact that it is only since the introduction of such machinery that the condition of the workers has improved so enormously, and where the greatest advantage is taken of labour-saving machinery it is found that real wages are highest, as, for instance, in America.

Many Trade Union leaders point out that the employer would get more production per man by using better and more modern machinery and employers are accused of restriction of output by using inefficient machinery. And at the same time the workers claim that greater production per man results in unemployment !

There is a curious fallacy that there is only a definite quantity of work to be done and that if men give greater output they are creating or increasing unemployment. A moment's thought will show the absurdity of this, because every child born into the world necessitates more food and clothing which means that greater production is needed. Moreover, the more production is increased per man, the wealthier the country becomes and the wealthier the country the higher the real wages, so that the worker for his own sake should endeavour to increase his production to the greatest possible extent consistent with his health and general welfare. This argument is not affected by the unequal distribution of the product ; that is quite another matter.

There is an impression in the worker's mind that the more he produces the more profit is going into the pockets of the employers. Taking industry on the average, this again is untrue. In individual cases where there is a monopoly or a protected industry or in boom periods employers may make great profits, but under such circumstances the workers are not any worse off, sometimes they are much better off. The average dividends paid by industrial Companies is a proof that employers are not making more, as a whole, than a definite

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percentage on capital, no matter how much the workers produce. It simply means that where the worker produces more, prices can be reduced, and this is followed by greater consumption, greater employment, and a greater quantity of commodities coming within the worker's reach, while the dividend on capital remains approximately the same on the average.

The fallacy of restriction of output has been fully dealt with on page 26.

## VII

### *Criticisms of Co-operative Production*

DURING the whole time we have been connected with this System an adverse criticism has never been passed on the principles involved. Whatever criticism there has been, and whatever objections have been formulated, refer only to its effect, or presumed effect, in certain cases which are almost entirely hypothetical. A practical manager who is in control of either the productive or the commercial side of a business will readily appreciate the value of these criticisms and objections. They will be mentioned here to give the reader an opportunity of weighing and considering them, and judging how far they are tenable. First, it should be said that when an argument is based on a case which is hypothetical such a case should be reasonable. Most hypothetical cases postulate conditions which are utterly impossible and do not constitute either argument or criticism in the face of facts which directly contradict them.

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It is stated that men will not do their best under a group bonus scheme. Our experience has proved this to be erroneous so far as Co-operative Production is concerned. That there is some hesitation at first is true in a few cases, but when the workers realise that the Standards are of their own making, that there are no rates to cut, that they receive the whole benefit of their extra energy, that everyone is included, their doubt vanishes. The further they examine the scheme the more they are satisfied, and after some months of successful operation there exists what one of them termed "the bonus atmosphere." and all the workers, with very few exceptions so far as we have been able to ascertain, put their shoulders to the wheel and work up to their optimum capacity, which is often in excess of their previous maximum. Under other group systems where the basis is not clearly understood or where benefits are intermittent or where there are several groups in the same factory, there is no doubt that the workers will not always work to the best of their ability and sometimes a worker will see to it that he does no more than the others, but this is not so under this System.

It is stated that a good worker will not do his best under a System where all receive the same percentage of bonus. In practice this again

proves untrue. A good worker will not limit his speed because in the first place such men are not so small-minded as to begrudge their fellow-workers a share of what they produce, especially when at times they themselves benefit by the production of the others ; in the second place, a good worker keeps up his normal speed without considering whether he happens to be doing a little more than the others ; and in the third place, his efforts and his output are an example to other workers. If he reduced his efforts other workers would tend to do the same and this would mean a general slackening of effort which would be to the disadvantage of everyone. Further, a good worker is ready and willing as a rule to help others rather than to limit his own output and by both precept and example he helps his fellow-workers, instead of hindering them by adopting a selfish limitation of output to that of the average worker.

It is also stated that a man earning high wages under a system of individual payment by results will never agree to work under a system where he receives no more than the average. This is a more reasonable objection than the last. It has been found, however, that where bonuses are high such men often prefer to come in with the rest, one reason being that the work of any particular man is not singled out for praise or

blame and he is neither requested to restrict his effort nor does he incur the enmity and suspicion of his fellow-workers. The remarks in the last criticism also apply to this one.

It is sometimes said that individual Payment by Results is better than a Collective System. This statement is too general to be of any real value ; it is essential to state the case more definitely before correct conclusions can be drawn. What is usually meant by Collective Payment by Results is the collaboration of several workers in doing one job or in doing several jobs ; in the great majority of cases it refers to one individual job. This job has a definite price or time attached to it just as in the case of an individual worker on a single job. The case is therefore not comparable with Co-operative Production, which is the only Collective System of paying Bonus on output which includes the whole of the employees.

Again, what are " better results " ? It may be pointed out that in some workshops men are earning 70 and 80 per cent. above their base rate. An examination of this statement shows that extremely few men are earning these high wages. And even in these cases there is a feeling that prices are too favourable to the workers.

But what is the effect of a few workers earning

high wages while others are earning only their day rate or a little above it ? In the first place there are nearly always jealousies between those earning good wages and the rest of the workers. It may be favouritism, by putting these workers on high-priced jobs, or it may be that they have better facilities either in working on good machines or under good conditions, or they may be better supplied with material. In the second place, the average increase of production over the whole works is not really affected by a few workers earning high wages.

It is frequently found that when men have earned a third above their base rate during any wages period they limit their output and take it easy until the next wages period begins. The reasons for this have been dealt with on page 57. This limitation affects the average very greatly. If the best workers limit their production to  $33\frac{1}{3}$  per cent. above the day rate then the *average* production over the whole factory must be considerably below this.

Again, it must be pointed out that under individual Systems or under a System of Collective Payment by Results on individual jobs, the residue of time workers is not touched and there is no incentive to these workers to work any harder or to devote any of their ability to their work.



Further, where two factories in the same neighbourhood are producing similar articles the piece rates become known and competition induces one or the other to cut the rates in order to lower the selling prices.

It was stated on one occasion that the direct producers are "carrying" the indirect producers and that they would receive the share which goes to the indirect producers if the latter were not in the scheme. This is a misunderstanding of the method of determining the Point Values. If all indirect producers were eliminated it would only mean that the Standard Point per Man-hour would be increased in proportion and the direct producers would receive exactly the same amount of bonus in either case. But the effort of all the indirect producers would be unchanged and would remain as before the System was adopted, which means that the direct producers could not earn as much without them as with them, and they would actually be at a disadvantage if the indirect producers did not come into the scheme.

Another statement is that any System of payment on output will put workers out of employment, or, if they are unemployed, it will keep them unemployed. This criticism applies to all methods of payment on output and not only to Co-operative Production. It has already

been referred to on page 26. The belief that underlies this criticism is that there is only a definite amount of work to be done in the world and that if one person does more than a certain amount he is to that extent depriving another person from getting a living. It is satisfactory to note that Trade Union officials no longer hold this view and that many of the more enlightened workers also realise the fallacy of it. We are not aware that any person has ever been put out of employment by this System, but we do know that its adoption has been followed by increased employment. Not only is there greater employment in the particular factory where the System is in operation, but the higher wages are usually spent, and as the articles purchased must be produced by other workers it means that there must be an increase in employment in other trades.

During a trade depression the bonus falls away and sometimes it is reduced to zero. This is true, but it is no fault of the System. As already mentioned, it is due partly to the retention of a nucleus of workers when there is not enough work to go round, and partly to the lack of effort of the workers themselves. The slack atmosphere tends to make the workers listless, especially when the management must, owing to force of circumstances, put up with

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the situation. The workers' psychology also bears on this state of things. It is curious that many men would rather work five days for five days' pay than work four days for five days' pay during shortness of work. It may be due to the conditions of their homes, or to having nothing to do and nowhere to go, but the cause is more usually the desire to keep their jobs. They think that if they are on short time and if they work to their "bonus" capacity during that time they are working themselves out of a job and it may be difficult to get it back again. However logical this may seem the result proves the fallacy of it. We have an instance where the men's bonus during a normal period reached 43 per cent. The sudden slump in the motor-cycle trade then occurred and the bonus came down to 0 per cent. in three weeks. The works was immediately closed as a further increase of manufacturing cost could not be faced. Had the men kept up their output the works would have remained open much longer.

A criticism of a different nature is that where there are two factories in the same district manufacturing the same article, one of which is badly organised and the other well organised, there is much greater opportunity of earning bonuses in the one factory than the

other. This is an absurd supposition. It is put forward as a hypothetical case, not an actual one. It cannot happen because the inefficient factory would very soon go out of business, their costs being so much higher than those of the efficient factory that they could not exist. Assuming, however, that such a thing could happen, the fact that they are both in existence shows that they are filling a place in industry and that they are both making profits. If, then, the inefficient factory adopts Co-operative Production the costs will be lowered and the factory becomes more efficient, but this does not make the efficient factory less efficient. It means that the inefficient factory is making more profits. If both adopt Co-operative Production then the men in the inefficient works can obtain more wages than in the other if they make the most of their opportunities to organise themselves. But this supposititious instance bristles with difficulties. The inefficiency of the factory must be due to management or machinery. If the latter, then the men can only earn more by working harder, while if the fault is in the management, the men would find it difficult to organise themselves under such conditions, as they would be subject to all sorts of interferences and obstructions. One might almost dismiss this criticism

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as too absurd to discuss. But a milder form of it may be mentioned : Suppose in two adjacent towns there is in each a machine tool works. Assume one to be better equipped and managed than the other and that both adopt Co-operative Production. Let it be granted also that conditions are such that the men have a greater prospect of earning higher bonuses in the less efficient works. Then there will be a tendency for this factory to attract workers from the other one. But how will the better equipped factory suffer ? The less efficient works cannot possibly attract all the men, and although costs will be reduced they cannot be reduced to the level of those in the efficient works. Moreover, the men in the efficient works will receive a bonus which approximates so nearly to the other that the difference will not induce them to change their employment or to travel night and morning to and from their work. Again, many workers prefer to work in an efficient rather than an inefficient factory. So that even taking the most favourable case in connection with this criticism the chances of one factory being at a disadvantage compared with another are negligible.

By adopting a Standard of existing production in an inefficient factory, it is suggested that this will stereotype this inefficiency and will prevent

further progress. In discussing the last criticism it was pointed out that such a factory fills a place in industry, otherwise it would not be in existence. It goes without saying that a good organisation is better than a bad one and that a scientifically controlled workshop will give better results than one in which the control is inefficient or lax. One cannot get the best music out of a violin, however expert the player, unless it is properly tuned up first ; neither can a surgeon perform an operation perfectly unless he has all his instruments sterilised and properly set out to his hand as he requires them. So it is with a factory or workshop, but whether a factory should be tuned up before putting in Co-operative Production is a question of expediency. If it can conveniently be done, it certainly should be done, but the flexibility of the System allows of all kinds of modifications and improvements after it is in operation without interfering with the basis. The enormous expense of tuning up in the great majority of cases, the difficulty of finding the proper staff to carry it out, the dislocation of production, the suspicion created in the minds of the workers during the tuning-up process, all make it desirable to introduce the System and carry out or continue improvements while it is in operation. This is all the more desirable because

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the System itself discovers many leakages, anomalies and inefficiencies during the investigation or during its working.

Where will be the advantage when all the factories in the country are working under this System? The suggestion which underlies this somewhat staggering question is that if every factory adopts the System the result will be a general increase in wages, but otherwise everything will be as before and there will be no incentive to maintain production at a high level. There will follow a reduction of base wages which will bring down the gross earnings to the present level of day wages, it is asserted. The assumption is made that all factories will earn exactly the same rate of bonus, which is absurd, and it will be evident after a moment's thought that if the stimulus of high earnings is removed, effort will be reduced, and in order to obtain increased production the whole thing must begin again. Moreover, high earnings mean greater wealth, greater spending power, more orders, more employment, more profits—so that any endeavour to reduce earnings will be to commit industrial suicide. The state of the Engineering Industry from 1922 to the present time is an example and a warning. By the time all the factories in the country have adopted the System it is to be hoped that the

conditions of industry and of existence generally will be such that men will give of their best without the incentive of increased earnings.

There is a tendency for work to be scamped under all forms of payment by results. This is admitted, though it is rarely found to occur under this System because on the one hand the individual gains little by doing the work badly as he is not paid on his own individual effort, and on the other, all work which is not satisfactory must be done again without being credited to output, or if it cannot be done over again the value is deducted from the total result. Bonus is only paid on good work and the workers themselves are the greatest, and sometimes the only, sufferers if the work is not up to the standard quality of the factory.

This System brings about such a condition of goodwill and contentment in the factory, and such confidence between the employer and the worker that it will put back the great social revolution which can only come about by starvation, misery and discontent. This criticism may seem astonishing, but it has been put quite seriously on more than one occasion. The reply is that if it has that effect, then the quicker and the more widely it is adopted the better it will be for the world in general.





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